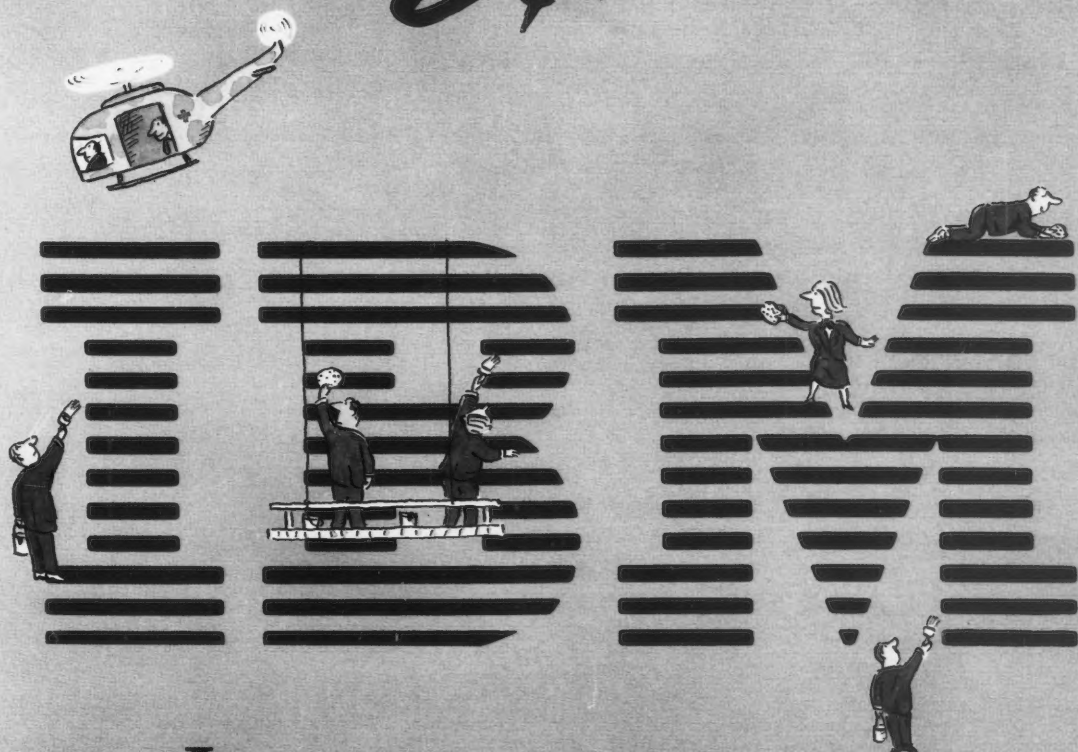


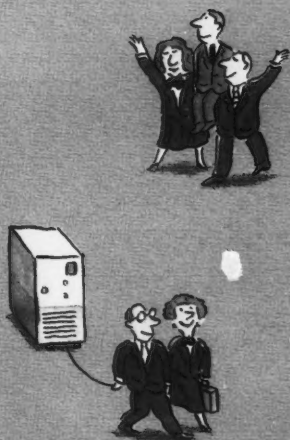
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COMPUTERWORLD

Extra



ITS YEAR OF PROMISES



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IBM'S YEAR OF PROMISES

DEPARTMENTS

Comment

—5—

The Bottom Line

—65—

Vendor Viewpoints

—30—

How-To

—60—

Exit

—68—

INTERVIEWS

Ed Lucente

Back to business based on trust.

—7—

David McDowell

Service before it breaks.

—63—

The Year of the Customer

*MIS managers rate IBM's changing style.**By Michael Sullivan-Trainer*

—13—

The new team approach with users.

—17—

How Soon Till SAA Products?

*IBM and selected vendors are readying the first SAA releases.**By Francis Gens*

—19—

Conforming to SAA.

—20—

The Unix alternative to SAA.

—22—

What's Still Missing from the 9370

*More parts are needed to create a complete mid-range system.**By Elisabeth Horwitt*

—25—

Trying the three-tier strategy.

—29—

One-Stop Software Shopping

*Applications finally receive their due at ASD.**By Stanley Gibson*

—32—

Master Plan for the PS/2

*IBM hopes the micro market will dance to an SAA tune.**By John Xenakis*

—39—

A new software platform.

—41—

Risk and Responsibility

*IBM as a systems integrator: mixing in other vendors' products**By Edith Myers*

—43—

PRODUCTS

The Last 12 Months

—47—

The Next 12 Months

—55—

The lifetime of a CPU.

—57—

The \$20 billion investment.

—59—

COVER ILLUSTRATION:
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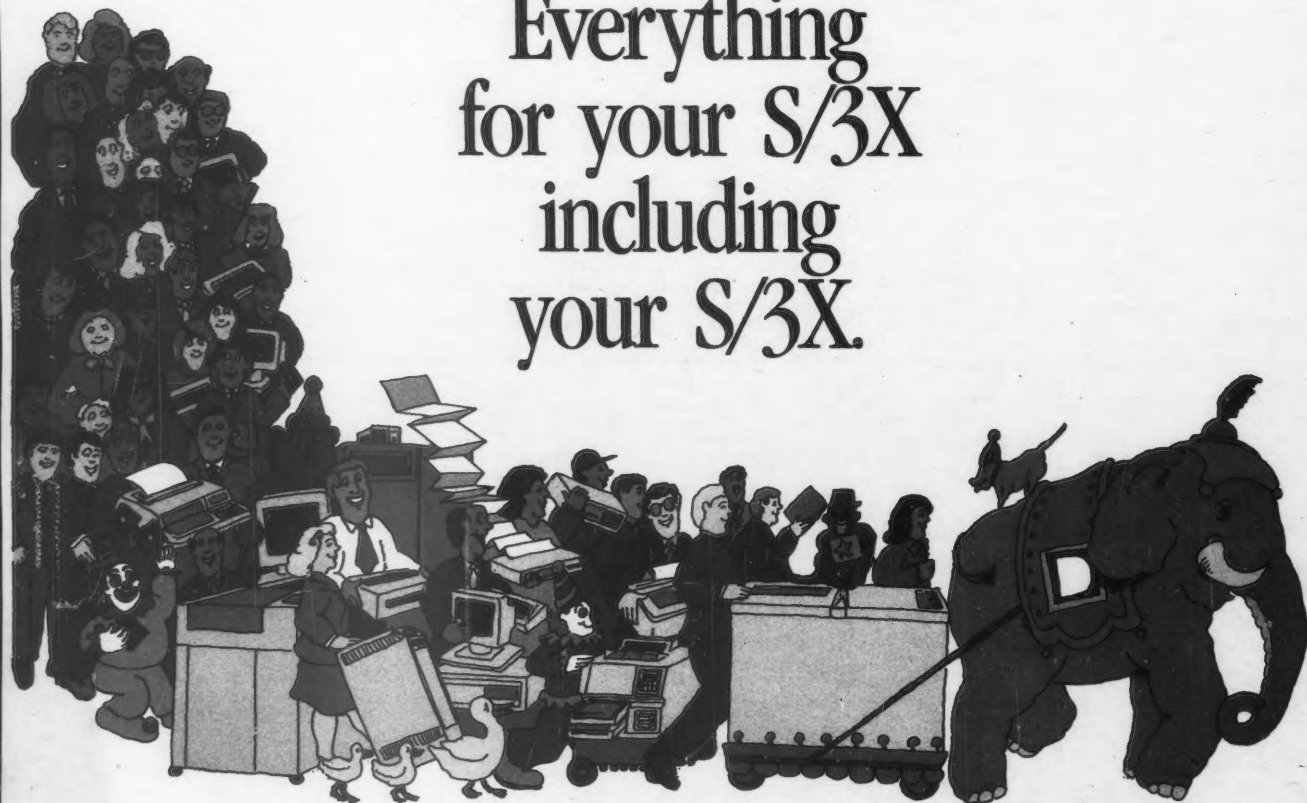
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COMMENT

IBM'S GREAT SEA CHANGE

BY DEIDRE DEPKE

There's a story about the 9370 told among IBM watchers this year that says a lot about how IBM is changing in 1987.

IBM Chairman John Akers picked up the phone one morning, the anecdote goes, and was forced to sit through a harangue from an airline industry executive. The company, Akers was told, was in the midst of an information systems overhaul and needed the 9370 product line immediately. The airline could not wait eight months until the 9370's planned introduction date.

Akers hung up the phone and called the 9370 product development staff. He told them to announce the machine ASAP. After all, he reminded his people, 1987 is the "Year of the Customer."

While the story may be exaggerated, the message it carries is not: IBM's Year of the Customer is more than rhetoric. The slogan represents a major change in the way IBM does business.

This year, the company has dramatically moved away from its tradition of dictating to customers — and to the rest of the industry — and moved toward becoming a responsive partner to customers and competitors. That effort has included revamping its product lines from top to bottom, changing the way products are sold, realigning corporate structure to increase efficiency and cut costs and, most astonishingly, changing its image.

Crucial response

IBM needed to make these drastic changes in response to declining revenue, a disenfranchised customer base in the mid-range and eroding market share in the personal computer and mid-range arenas.

The effort will continue through 1988 and beyond. Still, the progress made this year is considerable.

Faced with ever-increasing competition across its product lines, IBM this year has upgraded and enhanced its mainframe 3090 series; delivered a 370-compatible mid-range offering, the 9370, along with software and communications products; and abandoned the famous Personal Computer line in favor of the Personal System/2. The company has also pro-

Depke is editor of "IBM Watch," a newsletter published twice a month in Boston by IDC Communications, Inc.



BILL RUSSELL

vided guidelines for future hardware and software development by unveiling the Systems Application Architecture.

IBM has also, for the first time, aggressively pursued third-party resources to assist in a new thrust in vertical markets. This effort was combined with the release of new software offerings in the health care, financial services and travel industries.

But arguably more important than the changes in the products are the changes in the way they are sold. IBM said in May that it is now willing, even eager, to sell integrated solutions that include other manufacturers' hardware and third-party software. To install these systems, IBM will work with outsiders, such as value-added resellers and systems integrators.

The company has significantly changed its value-added reseller and dealer programs, requiring its partners to submit to extensive re-examinations of their businesses and undergo a vigorous training program in order to qualify for the PS/2 line.

IBM has also made it easier for customers to buy any of its products. This year, the company altered its Volume Procurement Amendment (VPA), which sets discounts for the largest customers. IBM simplified VPA paperwork and announced a plan to pay freight costs on products it ships to VPA customers, which could save the largest buyers tens of thousands of dollars each month.

Once preeminent in service and support, IBM saw its competitive posture suffer dramatically at the hands of third-party firms willing to

provide maintenance faster, cheaper and better. IBM has cut prices, provided on-site service with a 24-hour turnaround for nearly all of its customers and trained its technicians better in an effort not just to match but to beat the competition.

IBM's true strength has always been in marketing the company itself. For years, it succeeded at selling users the image of quality, reliability and service. Mounting competition from vendors offering the same thing at cheaper prices, together with IBM's very public financial decline, significantly weakened that image. IBM knew that new products and sales techniques were not enough to turn the perception around, so it launched an image overhaul and almost overnight dropped its cold-as-ice demeanor to become a friendly company.

Customers and industry analysts found themselves invited to frequent product briefings, where IBM actually gave them information on products under development. Gone was the bumbling Little Tramp character that had been used as a marketing symbol for the PC line and in its place was the friendly M*A*S*H team.

Openness and political virtue

The press has found, to its profound surprise, that IBM is adopting a policy of routinely granting interviews. Put into place was a special communications team charged with distributing positive information about the company. IBM removed itself from South Africa (although its products continue to be sold there) and diffused a broad stockholder attempt to force a complete withdrawal. IBM has even managed to somewhat alleviate its reputation as a slow-moving, bureaucratic organization by shipping some products early.

The company rather luckily pumped new vigor into the reputation of its research and development laboratories when a researcher working out of a basement room in IBM's Zurich facility chanced upon a ceramic material that dramatically improved superconductor conductivity. The discovery ignited frantic research efforts at companies around the world and landed two IBM scientists Nobel Prizes in physics this fall.

If IBM has gone to great lengths to be known to customers as friendly, sharp and efficient, the company has also taken pains to hone a very different image with its competitors. Once

Continued on next page

SEA CHANGE

FROM PREVIOUS PAGE

renowned for its fear of lawsuits (thanks to the U.S. Department of Justice's decade-long antitrust suit, dropped in 1980), IBM has sent signals that it will aggressively defend PS/2 technology, even if that means going to court.

Housecleaning

IBM's internal overhaul is as significant as its external efforts. Faced with consistently declining revenue, IBM badly needed to cut costs.

In 1986, as financial analysts accurately predicted a disappointing year for IBM, the company resisted Wall Street pres-

sure to change the no-layoffs policy set by founder Thomas J. Watson Sr.

Instead, the company announced the biggest restructuring in its history, shifting workers from manufacturing to sales and instituting an early retirement policy. The effects of those efforts have been felt this year; more than 10,000 employees have opted to retire early, and more than 15,000 of the company's 230,000 U.S. employees have moved into new positions. That effort is not over yet. IBM continues to shift workers into sales positions and will amass a 28,000-member sales force by the end of this year, up 20% from 1985.

The sales and marketing structure has been further realigned as IBM has phased out most of its marketing groups, trans-

ferring some of their responsibilities to headquarters at the Information Systems Group and some to the field through a new organization based on regional branch offices.

A new breed of rep

Since January, IBM has added 13 branch offices. Working out of these locations is a new type of IBM sales rep: the account development manager. These sales agents, of which there are now 150, focus on implementing long-term strategies for IBM's intermediate and large accounts. The new structure, administered by the Information Systems Group, has allowed IBM to eliminate much of its sales middle management.

IBM is still in the midst of moving its

manufacturing and development groups and divisions into new headquarters in Somers, N.Y. The move has brought consolidation and staff cuts — primarily at the middle-management level — to nearly every product-oriented division in the company.

This year, hardware-obsessed IBM has finally given software its due: In July, the firm created the Applications Systems Division, which is charged with developing applications software and consolidating the company's relationships with third-party developers. At the same time, IBM announced the creation of a mid-range marketing-support organization intended to shore up IBM's dismal performance in that area.

Has IBM's recovery plan accomplished in 1987 what the company intended? Well, not entirely.

On the product side, several gaps need to be filled. The company will not deliver its System/36 and 38 follow-on product, known as Silverlake, until mid-1988. To

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SSI allows you to postpone or eliminate the need for an upgrade to a bigger mainframe. You can get more computing power by connecting your existing CPUs or linking several smaller VM systems, rather than buying bigger iron. In many cases, you can save \$500,000 or more by using SSI and multiple processors to build a larger machine.

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If you have a large number of PROFS or other information center users that are outgrowing a single processor,

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Eliminate duplicate software licenses, including SNA

SSI's dynamic switching facilities save you the cost of having to license software on each processor since it can move virtual machines to the processors where licenses are held. In a two-processor SNA environment, eliminating the duplicate SNA-related software pays for SSI. With three or more processors, the savings are even more dramatic.

SSI Far Surpasses That "Other Company's" Offering

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Contact Charles Aronovici at (617) 288-4434 to learn more about SSI and to hear how SSI users are successfully leveraging their VM system investments today.

IBM's revamped image and sales strategy may have convinced loyalists to continue to buy from IBM, but the company desperately needs to open up new markets and infiltrate accounts that do not buy IBM products.

IBM's surprise, the market did not unquestioningly buy into the PS/2 technology change and is not likely to do so until IBM's OS/2 Extended Edition is shipped next year. And IBM's next-generation mainframe, code-named Summit, is not expected until 1989.

Wanted: New blood

IBM's revamped image and sales strategy may have convinced loyalists to continue to buy from IBM, but the company desperately needs to open up new markets and infiltrate accounts that do not buy IBM products.

That need is particularly felt in the mid-range area, where replacement buyers now far outnumber new customers. IBM's redirected and enlarged sales force will face the challenge of developing a new customer base in 1988.

Financially, IBM's cost cutting has done little so far to improve overall performance. Again, 1988 will tell whether IBM has done enough or must take more drastic measures, possibly including a reversal of its no-layoffs tradition.

As IBM's competitors — particularly Digital Equipment Corp., Compaq Computer Corp. and Apple Computer, Inc. — report escalating earnings and revenue, it is clear from IBM's 1987 financial performance that the company has not emerged from its slump.

While marketing and product improvements will help revive the firm's sales, IBM's challenge now is to maintain the momentum that is fueling its transition from a complacent industry giant to a proactive industry leader.

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▶ INTERVIEW ◀

Ed Lucente

BACK TO BUSINESS BASED ON TRUST

Ed Lucente is vice-president and group executive of IBM's Information Systems Group, with responsibility for market strategy for all IBM products. He was interviewed recently at the group's headquarters in Rye, N.Y., by *Computerworld* Extra Editor George Harrar and senior writer Michael Sullivan-Trainor.

Why is 1987 the "Year of the Customer" for IBM?

The Year of the Customer has been interpreted to mean that this is the year that the IBM salesman is focusing on the customer. The IBM salesman has always been focusing on the customer.

The concept originated at our strategic planning conference last fall, where we invited a group of executives from our customers to join us for the first time. John Akers and members of the corporate management board participated just as if there weren't any customers there.

We asked these customer executives to talk about what it was like doing business with IBM and what we do that they like and what we do that we should improve upon. Essentially, they told us they needed to know more about where we were going and where we were investing, particularly in software.

They told us we needed to remove some of the complexities in our contracts, in our terms and conditions, and acknowledge the fact that we were doing business on an international basis and that we needed to have more consistency with contracts around the world.

They also told us they wanted to see more IBMers who understood their business problems and could help them relate business problems to potential application solutions.

We had several of the key development executives present their strategic directions. The consensus on the part of the customers was that if we did nothing more than allow our customers to understand our strategic directions, it would tremendously benefit the customers and go a long way to cementing the partnership. They really felt they were making these decisions in the dark, and there were a couple of situations where they felt they went down the wrong path and wouldn't have had they known our directions.

We did not preannounce products to them. — We just showed them our strategic directions. But we used the executives responsible for making those investment decisions to give presentations.



JOHN CHASSON

As a result of that meeting, we told the manufacturing and development divisions that 1987 was the Year of the Customer and that their job was to get out and disclose their directions and make sure that their directions are consistent with where the customers are going. In the process, not only would the customers benefit, but we would benefit.

At the same time, we put together an international task force to look at our contracts, terms and conditions and the overall complexity of doing business with IBM and said, "We're going to deal with that in 1987."

So the three things we did in 1987 were provide more people with better business training, improve contracts and reduce complexity and get development people out talking directly with customers, showing strategic directions. Put those three things together, and that is what makes 1987 different from any prior year.

So '87 is a transition year. We're not going to declare '88 the Year of the Customer or say that '87 is the last Year of the Customer. It is not a year; it is a change in direction.

How do you measure your three goals for the Year of the Customer?

I get a lot of opportunities to talk to customers directly. We have now conducted three national forums and 10 to 12 regional forums where we have presented our strategic directions across the major parts of our product line to 1,000 to 1,200 customers.

Some of these customers wrote to me personally, and their reaction was the same as [those of] the executives who participated in our planning conference: "Best meeting I've ever been to with IBM. You should have done it a long time ago. I hope this isn't the only time you do it."

So that's one barometer of success. And

we're going to do it again next year, probably in the fall.

What customers qualify to attend these conferences?

Next year — this is still tentative — we will probably have a forum for each of the divisions: for instance, the north-central division and the southwest division. It will probably be for the top 200 to 300 customers in each of those two divisions. It will be for the information systems executive, the CIO. Sometime coincident with that, we will have a similar program which will involve what I will call the "end-user executive." That will be a series of industry-oriented forums across the 13 industry segments, focusing on the top 500 accounts. We'll bring all manufacturing end-user executives together and give them that same strategic direction, but we'll also put heavy emphasis on the applications that support their industry.

What is the status of your other two goals: reducing complexity and providing more people with business knowledge?

As far as the contract, terms and conditions and simplification are concerned, that is ongoing work. We have a group of six customers that we're working very closely with. Our corporate vice-president of marketing has taken it upon himself personally to understand the requirements of these six customers and make sure that the changes we are making conform to where these customers would like to see us go. They happen to be international customers that represent several different industries.

Essentially, we're trying to get back to doing business on the basis of trust, where the customer signs a contract once for hardware and software and then continues to do business with us on a transaction-by-transaction basis without having to go back and re-sign contracts.

I've called on customers, specifically Westinghouse, and spent a lot of time talking to their people about the complexity of doing business with us. They are working with us to make sure we continue to move in the right direction. We've reduced the number of volume procurement agreements, the number of exhibits and the number of things our customers have to sign.

For example, there is a single contract for hardware and software for volume procurement agreements. In the event it is necessary to

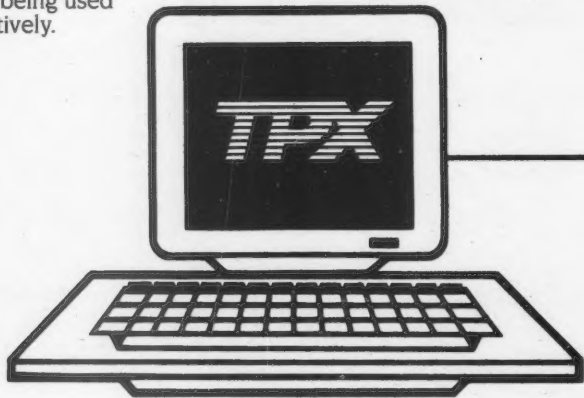
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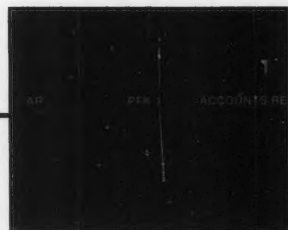


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BEFORE



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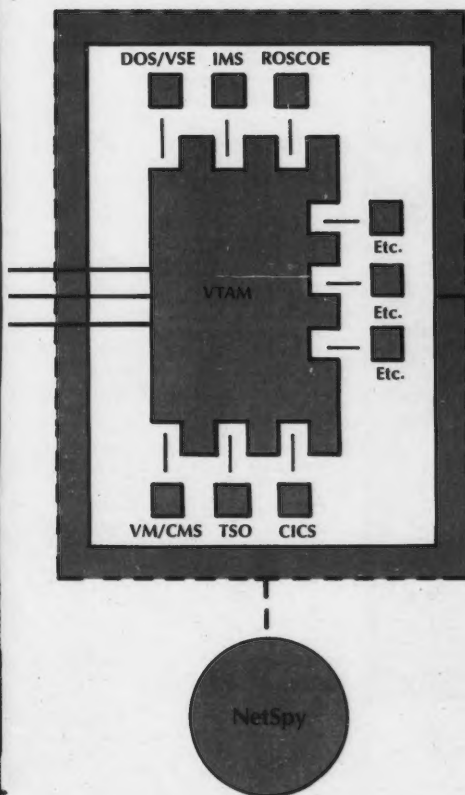
Terminal Productivity

VTAM Monitoring NetSpy

NetSpy is a VTAM network performance and end user response time monitor that lets you decide if your network

When using a multiple session manager such as TPX, you can access many different applications from one terminal. NetSpy has interfaces to TPX to measure true "end-to-end" response time. This information is not available from any other source.

be programmed to connect to and access an external data network, perform a retrieval, journal the results, and then disconnect—all initiated with a single keystroke.



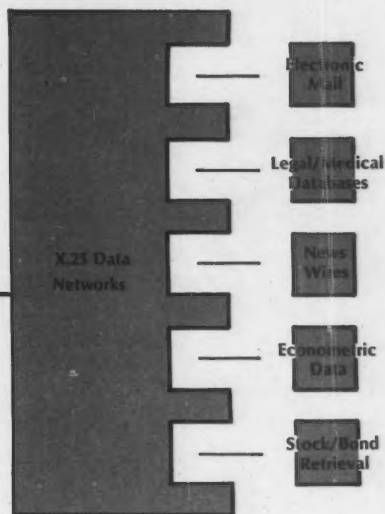
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BUSINESS

CONTINUED FROM PAGE 7

have some kind of technical disclosure, we require today that each be dealt with on an agreement-by-agreement basis. We're going to use this single-library-card approach here again.

The idea is that the customer signs four or five pieces of paper and puts them in the drawer. We put our copy in the drawer. We now have a basis upon which to do business. Then we just do business.

So the goal of removing the complexity from contracts has not been met yet?

The job's not finished. The task force is

still in effect. We made some major changes in June.

In the third area, we have just completed the largest redeployment effort in the history of our company. We've moved some 4,800 people from our plants and labs and another 3,000 from our headquarters staffs.

When you take that into account, plus the hiring we did, minus the people that left during the retirement incentives, we will increase our branch office organization, sales and systems engineering support by 27% by the end of the year over this last period of some 18 to 24 months.

Two-thirds of those people had to go through training, because they were not previously in branch office positions. The bulk of that resource is just being felt by

the customers.

As far as what's next, we've been working with some pilot accounts to develop a set of models that enable us to relate information systems investments to their overall business strategies. I talked about this for the first time publicly at the Guide meeting in September.

The technique is to use a combination of IBMers and customers over a five-day period to analyze the business objectives of the customer and analyze his portfolio of applications. Then, using proprietary software and a fairly large data base to compare this customer against a composite of his competitors, we point out where there are opportunities to use information systems to develop new applications to improve their overall business plan in

terms of market share and profitability.

Starting at the end of this year and through the balance of 1988 and into '89, this program, which we are calling IS Investment Strategies, will become the platform for most of our marketing activities.

My objective is to make sure that the IBM marketing organization is absolutely the best equipped sales force when it comes to understanding where our customers are going, what their business problems are and what kind of applications we offer that represent solutions to those business problems.

That's something we have always been very good at, but the nature of the applications is changing on us. Our customers are now talking about applications that are a lot different than doing something they're doing today, only doing it faster.

They're really talking about applications that change the way they do business. And that means that, in many cases, you need to have not only the information systems executive involved, you've got to have the end-user executive as well, because that's the person who is trying to develop a product and develop a market.

We want to establish a stronger partnership between the sales force and the customers by relating to a common set of business problems and to make sure we're in there marketing applications solutions, not just hardware and software. Based on the pilot efforts and a fair number of customers we've put through this exercise, we're very confident and committed to implementing it now across the board, as fast and for as many customers as we possibly can.

The other thing we're doing is investing a substantial amount of our training dollars in increasing the technical specialization of our systems engineering organization.

We've now concluded on a number of specialty skills that we think cover the gamut of requirements. For example, one set of skills is the area of data base applications enablers, including products like DB2, Applications Systems and CSP [the Cross System Product], a group of software programs that go hand in glove with helping customers develop applications.

We have concluded on how many in-depth technically trained system engineers we need in that category, and we've done that across some 22 different technical skill categories.

Are the Corporate Service Amendment (CSA) and the Mid-range System Amendment part of the consolidated contracts process?

No. For example, the hardware and software agreement is the acquisition of those items, not maintenance. In maintenance contracts, to date we have had contracts for every machine. By introducing the Corporate Service Amendment, we now give the customer the opportunity to embody all the products he has under maintenance under a single contract.

But there are problems with that. To give you an idea of what I mean when I say the work is not done yet, machines go off of warranty at different times, and they are installed at different times. So you have to continue to issue updates to any existing contract.

A key part of the CSA seems to be the discounting schedule. Formerly, IBM said it did not offer

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COMPUTERWORLD

NOVEMBER 18, 1987

discounts on maintenance. Is discounting part of the Year of the Customer campaign?

That's not, per se, in response to the Year of the Customer. We have, for a long time, had a series of network and systems maintenance tools that we've used to help reduce our overall cost of maintaining customer installations. We have encouraged customers to use those.

One of the things we're doing with the CSA is that if the customer is willing to use those tools and they agree to keep their installation at some level of maintainability, we pass our savings on to them in the form of a discount, a lower price for the maintenance. If the customers don't use those tools, they don't qualify for the CSA.

That was really in response to a couple of things. One, just as we have customer satisfaction surveys with marketing, we have satisfaction surveys for maintenance. And we detected — not just here but particularly in some of our non-U.S. countries — increasing dissatisfaction with the overall service or maintenance business.

It was the combination of the lack of visibility of the maintenance man as we were doing more of our servicing remotely, the unwillingness on our part to do certain things and, again, this contract business, the fact we were billing them so often.

We attacked this thing on an international basis to come up with what we should be doing in the service business. We had 50 to 60 customers where we went in and said, "Let's see what happens if we let you use these tools." We did that from mid-1985 to mid-1986. The combination of these satisfaction surveys and what we learned from the pilot accounts eventually led us to a whole series of actions. That set of actions included transferring our programming support reps from our National Service Division to our marketing divisions, but also helping the customers manage their overall installations problems, installations planning, systems relocation and so forth.

When will more technical details be released concerning the Systems Application Architecture (SAA)?

The technical interface information is scheduled to be released sometime during the fourth quarter. That will be a continuum of events every 90 days with sort of a two-year reach. In other words, anything we're going to be incorporating within the next two years, we'll tell you about.

For example, at Guide, one of the questions was, "Is RPG part of SAA?" The answer is yes. They asked, "Well, why haven't you told us?" The answer is, because we're not going to tell you anything for sure until we have a technical plan that has it deliverable within two years.

So that's a set of guidelines we have put on the development organizations and is the basis upon which we'll continue to release information about SAA.

IBM's mid-range strategy seems to be coming down to a dual-architecture strategy consisting of the System/36 and 38 and the 370. What does the customer gain by having a choice between two architectures rather than one, as some of your competitors can offer?

First, we have two mid-range, general-

purpose architectures. For example, customers don't consider Unix a general-purpose architecture, but, certainly, we plan to support Unix across the board, including the mid-range.

There are more than a quarter of a million System/3X architecture machines installed, and without question, the most successful mid-range architecture in sheer numbers is the 3X. That may be one of the best kept secrets. So if you were to say, "Let's talk about IBM's premier mid-range architecture," the premier mid-range architecture is the 3X.

The next question is, "If that's such a good architecture, why do you need to have another general-purpose architecture?" The answer is because we have a whole lot of customers that have 370

mainframe hosts installed who want to distribute that same application software on mid-range 370s.

In response to that, we announced the mid-range 9370 and, in particular, offer the VM base of capability so the customer can have complete portability between the mainframe and the mid-range.

I wouldn't advocate that any customer, for any reason, install both architectures in the mid-range, but it would be absurd for us not to have two architectures given those conditions I just described.

You mentioned the redeployment of personnel from headquarters and the labs and plants. Is there a hiring freeze in certain areas of the company?

Yes there is. Right now, the only place I think we're hiring are programmers and marketing. But obviously, we're being very selective and careful about it. We want to make sure the hiring we're doing is critical hiring for very specific reasons. We will be hiring in marketing in 1988 at equal to or maybe higher levels than in 1987.

It's not a corporate freeze. If you ask where we're hiring, I would say it's where I told you. I don't think, for example, there's a lot of hiring being done in direct manufacturing, because as plant efficiencies improve and automation programs have been implemented, there has been less and less need for hiring. But I wouldn't say we're under a corporate hiring freeze.

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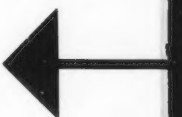
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YEAR OF THE CUSTOMER

Did IBM treat you royally?

.....

BY MICHAEL SULLIVAN-TRAINOR

IBM is beginning one of the most drastic periods of change in the company's 63-year history. Strategies and policies that the \$51 billion corporation has counted on since the days of Thomas J. Watson Sr. are no longer valid. Slow revenue growth is threatening IBM's long-held goal of becoming a \$100 billion company by 1990.

To fire IBM's stalling engines, Chairman John Akers has initiated broad measures that will remake the image and the substance of the company in the next five years. While this year is noteworthy for significant IBM product deliveries — a new mid-range processor family, communications software and hardware and a strikingly different personal computer series — 1987 is more importantly IBM's year of promises.

In January, Akers promised that by 1988, IBM's customers would perceive a different, more open company, one that is more interested in meeting their needs than pushing its hardware. This promise grew out of a strategic planning meeting in late 1986. For the first time, customers were invited to a session to hear about future product directions firsthand from IBM executives.

Sullivan-Trainor is a *Computerworld* senior writer.

During the course of the meeting, the customers asked Akers why they weren't mentioned in any of IBM's traditional goals. Akers responded with a new goal for the company: enhancing customer partnerships. For 1987, this theme became known as the "Year of the Customer." The many interpretations of the phrase come down to one general idea: IBM wants to improve its relationships with MIS managers and executives.

"They've made a concerted effort to get to my level," says John Putney, executive vice-president of office and information systems for the Teachers Insurance & Annuity Association of America's College Retirement Equities Fund, based in New York.

"They weren't reluctant to work with us before," he says. "It was more benign neglect. They had no incentive to spend time here. Now, they have gone back to what they were doing in the '60s. I was disappointed I hadn't seen it before now."

IBM's actions in carrying out Akers' mandate hark back to the way IBM worked years ago, with more market representatives and service personnel on-site and more interaction between MIS and IBM.

"Everyone has a different view of what
Continued on next page

CUSTOMER

FROM PREVIOUS PAGE

the Year of the Customer means," says Bill Steuk, group director of IBM's telecommunications marketing and service. "The Year of the Customer is really a state of mind, a rallying point."

A new twist this year is how much IBM will reveal about its product directions.

"IBM has opened up this year to a degree that I have never seen," says Dean Redfern, corporate vice-president at McCormack & Dodge Corp. in Natick, Mass.

"I have signed 112 nondisclosure agreements this year," Redfern says. "That is more in one year than I have signed in my past nine years."

"IN MANY accounts, we are losing business opportunities to an advertising campaign, or the customer elects to build more stores as opposed to investing in information systems"

JACK HAMMOND
DIRECTOR, IBM'S INFORMATION SYSTEMS
INVESTMENT STRATEGIES

Also different from years past are the changes IBM is making in its perception of the industry. Traditionally strong mainframe sales caused IBM to be reluctant to accept the trends of the '80s: distributed processing and the popularity of

minicomputers to drive it, end-user computing and the broad acceptance of personal computers and the need for efficient software that supports strategic applications. A general industry slowdown and the particularly sluggish growth of main-

frames sales forced IBM to wake up to the changes these trends were bringing about.

IBM responded with promises: Systems Application Architecture (SAA), a single software architecture for its major hardware environments; Silverlake, a processor combining attributes of the System/36 and 38; and a new division dedicated to developing applications.

"They seem to be more oriented toward end-user computing than in the past," says Ted Jastrzembski, an analyst at Framingham, Mass.-based International Data Corp. (IDC). "IBM's a huge organization, and it is very difficult for them to change in one year. They're taking steps in that direction."

Historic steps

Internally, IBM also took historic steps. To trim operating expenses, it closed manufacturing plants or turned them into distribution centers — something it had never resorted to. Holding to a pledge that it would never lay off any employee, IBM instead transferred workers by the thousands from manufacturing to marketing and service.

While IBM's moves this year are aimed at limiting competitors' market gains or reducing overhead, one of the more significant efforts initiated in 1987 seeks to counter customers' decisions to invest in other areas of their business.

"In many accounts, we are losing business opportunities to an advertising campaign, or the customer elects to build more stores or to buy more locomotives as opposed to investing in information systems," says Jack Hammond, director of IBM's Information Systems Investment Strategies (ISIS).

"We want companies to look at information systems as instruments of growth, the same way they look at other capital investments," he says.

ISIS is a methodology for developing information systems applications that directly address a company's strategic business goals. The campaign will be the focus of IBM's marketing efforts for the next several months (see story page 17).

Even with ISIS and the changes wrought by the Year of the Customer drive, IBM still has a lot of rethinking to do.

"DEC has realized they are not in the computer business; they're in the business solutions business or something like that," M&D's Redfern says. "I don't think IBM realizes that yet. Most of the IBMers I see still think they're in the computer business."

"They can't keep coming out pitching newer, better, faster hardware. There has to be a cause and effect between that and the economy of a business," he says. "They haven't made that connection yet. Once they do, they will take off again."

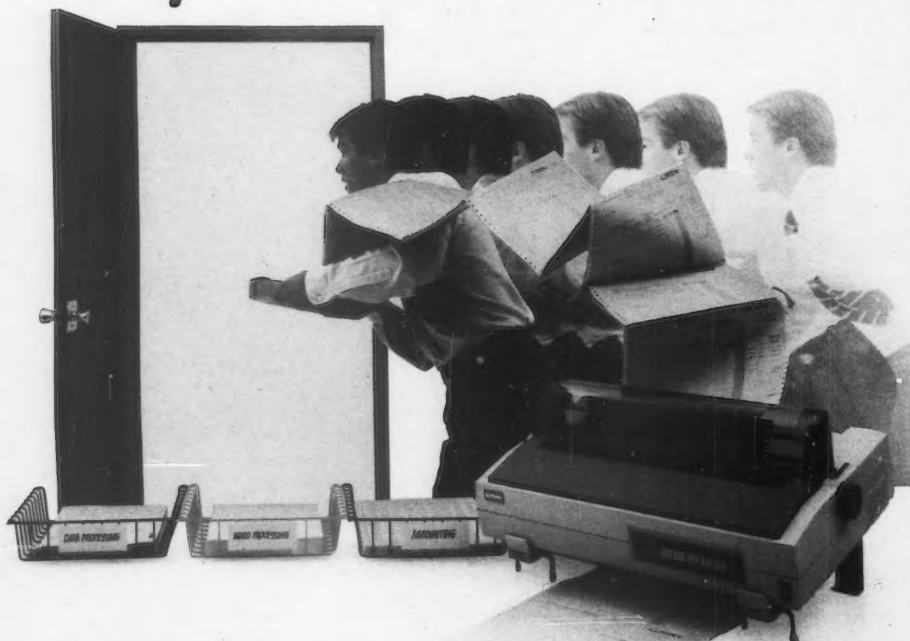
'No difference to customer'

In the meantime, MIS executives are reacting cautiously to the steps IBM has taken to renew its image. "It's the products that back up the promises that make the difference in the long term," says IDC's Edward Acly, program manager of Software Technology Services. "These marketing blitzes don't make that much of a difference to the customers."

Because IBM has historically been reluctant to reveal its long-term product strategy, it is the new sharing of product direction with MIS and consultant

Continued on page 16

The C-815 Supra 24-pin printer My life in the fast lane



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CUSTOMER

CONTINUED FROM PAGE 14

communities that appears to be the most drastic change.

"They have been much more open in answering our questions," says Joseph Vincent, director of computer performance and capacity planning at Humana, Inc., a Louisville, Ky.-based health care management company. "They were so candid on MVS, I wish I had taped it."

Marketing representatives are no longer the lead speakers at customer or analyst presentations. IBM employees with product development responsibility are standing up and answering questions about product directions. Redfern attends IBM briefings as an executive in Dun & Bradstreet Corp.'s information systems group. (D&B is M&D's parent organization.) At the briefings, he finds that he can ask any question, about IBM's next-generation mainframe, for example, and receive a thorough answer.

"I actually met my first IBM programmer, who is coding the product I was interested in. That's never happened before," Redfern says. "When I finally met one, I offered him a job. That's probably the last one they

will let me meet."

In the short term, IBM may lose more business than it will gain with this strategy. "We all want to ride the wave [of new products] up, not down," Redfern says.

Disclosures on Silverlake, for example, will prevent users from buying System/36 and 38 machines. In the past, IBM would have pushed those systems right up until the day of the new announcement.

In the long term, IBM hopes to gain a tighter relationship with MIS executives, a relationship the company hopes will lead to equipment sales.

'In tune'

In some cases, that strategy may pay off. "If I have more confidence in knowing what is likely to happen, I will try to be more in the mainstream," Teacher Insurance's Putney says. "Before, I felt their direction was not one we were going in. Now we are in tune with them, and they are more in tune with us."

The Smithline Beckman Corp. Animal Health Products division in West Chester, Pa., is another organization that has been enjoying IBM's new style.

"They decided to take a better approach with us. We're a national account," says Terrence

Connor, the division's MIS manager. IBM conducted a half-day seminar for Connor's group to explain SAA the day before it was announced. Connor has also been kept informed of developments with Silverlake.

But will IBM's efforts affect his purchase decisions? "I don't

maker of medical supplies. "The new products information is somewhat of a tease. They told us about Solutionpacs as if they were in place all over the country. When we asked about them, they said they weren't available yet."

Humana's Vincent took IBM

contingency planning for CPU acquisitions. "They said that the MIPS rate would be three digits by 1990, and the first digit would be a one. That's not the answer we needed for good planning. It could be anywhere from 100 to 199."

Secrecy still exists

Frank Lesser, president of Financial Technologies, Inc. in Chantilly, Va., is also having difficulty getting answers from IBM, despite the new openness. "The cloak of secrecy has not gone up for us. I've been to Poughkeepsie and Endicott, N.Y., and things still seem fuzzy." Lesser's frustration stems from his company's interest in purchasing a small 3090. The firm owns a Model 150 and asked whether IBM might offer a smaller system. The IBM representative Lesser spoke with said there were no plans to produce one. Six weeks later, the Model 120 was announced.

"Then I asked about an XA version of VM," Lesser says. "The answer was almost like taking a survey: Early returns indicated it would be available in 1988. That was the week before VM/XA was announced."

MIS executives who already feel they are on the top of IBM's

Continued on next page

IBM's 1987 PROMISES

- ☒ Develop an IBM-user team approach to strategic business planning
- ☒ Simplify contracts and make them consistent with overseas agreements
- ☒ Be more open about product strategy to allow better customer planning
- ☒ Make service personnel more available at customer sites
- ☒ Combine IBM and Rolm expertise to meet user communications needs
- ☒ Provide a single software environment across all product lines
- ☒ Create a mid-range architecture combining the System/36 and 38

CW CHART

look at them as unfavorably as I used to," he says. "IBM used to be here with the other vendors and say: 'Here's our solution. Take it or leave it.' Now they are scrambling more, just like Wang, Hewlett-Packard or DEC."

Other MIS executives are less impressed by IBM's efforts. "They have been a little more cordial and informative, but that is incidental," says Ray Tepfenhardt, MIS manager at C. R. Bard, Inc. in Murray Hill, N.J., a

up on its offer to provide details of future product strategy, so IBM flew Vincent and his staff to Poughkeepsie, N.Y., to brief them on the 3090 and MVS/XA.

"They gave us very good answers on most things but only half an answer on our biggest question," Vincent says. The question was this: What will the millions of instructions per second (MIPS) rate be for high-end 3090s by 1990? This information is important to the group's

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THE NEW TEAM APPROACH WITH USERS

For the next several months, IBM's marketing efforts will be aimed at swaying the expenditures of its customers away from other capital expenditures and toward investments in information systems.

Through a program called Information Systems Investment Strategies (ISIS), IBM marketing representatives will work with MIS and business executives in selected corporations to develop business plans that identify areas in which information systems' money can most effectively be spent to increase the company's revenue.

Begun as a pilot program at IBM's Advanced Business Institute in Greenwich, Conn., ISIS is being promoted internally at IBM so that marketing representatives can offer the program to certain customers who express an interest in it. "We plan to expand the number of participating companies fairly dramatically next year," ISIS Director Jack Hammond says.

The program requires an average of two months of data collection and analysis, in which a company's finances, business goals and information systems investments are compared with what is typical for the industry. No fee is charged to the participants, who are asked to discuss their business plans confidentially with an IBM marketing representative. The user company receives recommendations on revenue-generating information systems investments.

"The way it is being described in press releases and in other places, ISIS seems a little like a magic wand, and it really isn't," Hammond says. "It just gives us a starting point to discuss business issues at a different level from that of how fast products are or what the

MIPS rate is. It's not a revolution of any kind. We've had some outstanding successes — and some duds, too."

IBM hopes to gain better relationships with customers and, ultimately, to increase business through the program. But ISIS involves a substantial investment of resources: specifically, dedicating a marketing representative's time to coming up with recommendations that may or may not be accepted. Because of the amount of time required for the analysis, IBM is promoting ISIS cautiously.

"Most of the customers we've talked with are willing to do it. We're torn between too much publicity and not enough. If it's too popular, we won't be able to do it," Hammond says.

IBM's marketing representatives attend a series of sessions at the Advanced Business Institute and meet extensively with customers to carry out the program.

The first session is an introductory review of the process held before the representative calls on the customer. After an initial meeting during which the customer agrees to participate, the representative engages in four to six weeks of data gathering.

Information regarding the customer's computer system investments — in both IBM and non-IBM equipment — is collected, along with descriptions of the business plans.

In parallel with that data collection, IBM compiles a profile of the company and the industry in which it operates based on publicly available financial data, such as the Value Line, Dun and Bradstreet and Standard and Poor's data bases.

A model of the company is then constructed using

an IBM Personal Computer-based software program developed by IBM. The program projects the company's financial performance during the next five years.

"We don't have any assurance that projection is accurate; what it is Value Line's best judgment, and we use that as a point of departure for discussion," Hammond says. "Often, the customer will say the revenue growth isn't fast enough. They intend to grow faster than that."

Once the model is complete, the market representative compares his customer's profile with those of other companies in the same industry. The representatives analyze this material in a five-day workshop conducted by industry experts within IBM.

The applications portfolio of the company is also examined and compared with what is typical for the industry. Finally, the representative finds business segments within the company in which information systems can make a difference at the bottom line.

Ultimately, the customer receives three to five very specific recommendations about how information systems investments can be made to enhance the business. "The technology we work out later," Hammond says, "although we do have to make some gross estimates of what is involved in order to feed the cost streams."

Not all customers will implement the recommendations, but the marketing effort is worth it from IBM's point of view, because of the amount of knowledge the marketing representative gains about his customer.

"The better we understand a customer's business, the better we can serve them," Hammond says.

MICHAEL SULLIVAN-TRAINOR

CUSTOMER FROM PREVIOUS PAGE

list when it comes to information about product strategy say IBM's new openness is aimed elsewhere.

John Nack of Caterpillar, Inc. in Peoria, Ill., receives a great deal of firsthand information from IBM executives as president of Chicago-based Guide International Corp., an association of users of large-scale IBM computers.

'Coming out of shell'

"Guide has always had an open dialogue with IBM. Gradually, it has become more open," Nack says. "Now, they are sharing more openly with other sectors. They are slowly coming out of their shell and delivering better statements of direction."

Likewise, Dale Preston, MIS director for Bristol-Myers Co., always hears about IBM's product strategies from his marketing representatives.

"We're always pretty much apprised of what's going on," Preston says. "Actually, I think this campaign is for smaller accounts that have not been receiving the attention."

One such account, the SCM Office Supplies Group at SCM Corp. in Marion, Ind., is not finding IBM any more open about products than in the past, but DP Manager Jeff Mahoney is receiving better service.

"I've kept my ears open for information about Silverlake, but I only hear things from third-party vendors — nothing from IBM," he says.

However, after months of trying to obtain tuning information for his shop's System/36, Mahoney finally received the advice he needed when a new marketing representative was assigned to his account.

Increased presence and more responsive service representatives are the promises that are touching smaller IBM shops.

For example, IBM is making it easier for its marketing representatives in southeastern Michigan and northern Indiana by giving them smaller territories, says Roger Peck, a systems consultant in Bridgman, Mich., who services System/36 accounts. "IBM's presence in these sites was nonexistent. They're realizing that if they spend more time with their customers, they'll come back [from doing business with third-party vendors]," Peck says.

While IBM is paying more attention to its customers, the firm seems to be less interested in courting users who are pursuing different systems strategies than the ones IBM advocates. Echlin, Inc., an automotive parts manufacturer, is converting from an IBM 4381 environment to one based on microcomputers, including Compaq Computer Corp. Compaq 386s and IBM Personal Computer ATs.

The change was spurred by an estimated \$300,000 annual savings the company expects to achieve through reduced hardware and software maintenance costs, according to Richard Hock, MIS director for the firm.

'No interest in us'

"IBM has no interest in us," Hock says. "We're getting rid of the baggage of the 370 architecture. I'm not down on IBM, but the 370 architecture leaves a lot to be desired for mid-size customers, and the 9370 is the same thing warmed over."

Despite Echlin's change of strategy, other vendors, including Digital Equipment Corp., Unisys Corp. and Honeywell, Inc., are still trying to sell equipment into the shop. "Marketing used to be IBM's strength. Now, unless they see daylight, they don't do a good job," Hock says. "I'm amazed. I get much more attention from the other vendors."

IBM's efforts seem to be focused first on improving relationships with MIS managers in its installed base and second on attacking specific competitive situations, such as challenging DEC's offerings. Slowly, the company is addressing the myriad of complaints from its current customers.

In a survey of 16 large MIS shops early this year, Charles Mathey of The Futures Group, Inc. in Glastonbury, Conn., found the dominant concern to

be IBM's threats to reduce service and support if a shop installed competitors' products.

"IBM picked up on customers' concerns about loss of service, and that caused them to put the Year of the Customer in place," Mathey says. "It is long overdue. It may have more value internally than externally."

For the long term, how well the changes are accepted and carried out by IBM's employees will determine if the company will be a better business partner for MIS.

"I would like to extend the Year of the Customer concept at least through the rest of my career," IBM's Steuk says.

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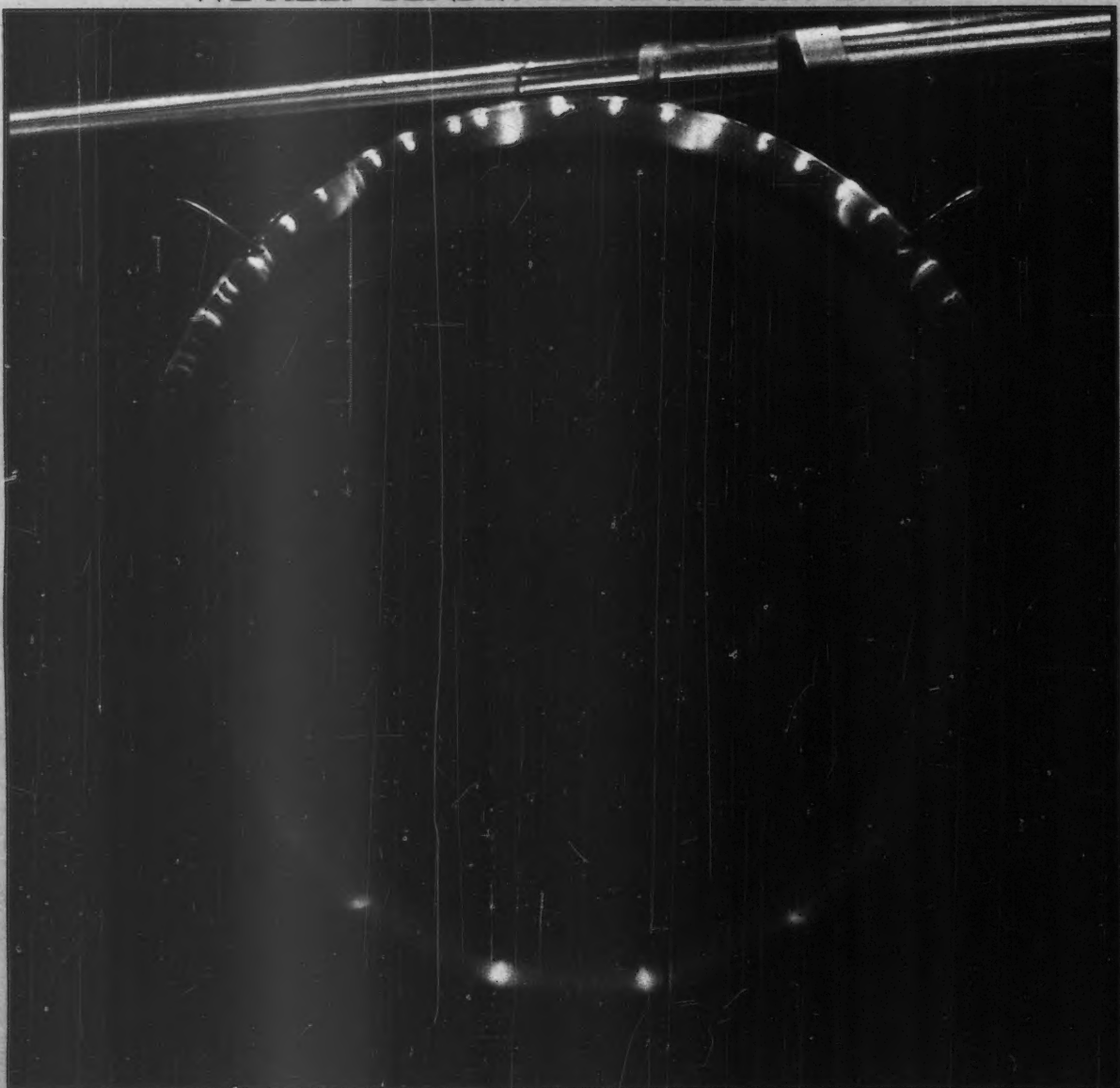
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HOW SOON TILL SAA PRODUCTS?

*IBM must demonstrate the technical viability of SAA
within the next 18 to 24 months
by delivering an actual SAA package*

.....

BY FRANCIS R. GENS

Systems Application Architecture — SAA — is a promise from IBM to provide the same application environment in its three strategic processor families: the Personal System/2, the 370 and the 3X (the combined System/36 and 38 family that is expected to be announced next year).

IBM is attempting to create this hardware-independent application environment by providing the same programming tools, such as languages and compilers, a

data base access language and a dialogue manager; communications services like a network application program interface, terminal-emulation capabilities and physical connectivity options; and a user interface with each of the four "SAA operating systems" — VM, MVS, 3X and OS/2. The list will evolve and increase subject to customer/market demand. For example, IBM will undoubtedly add RPG II to SAA when the new 3X, code-named Silverlake, is announced next year.

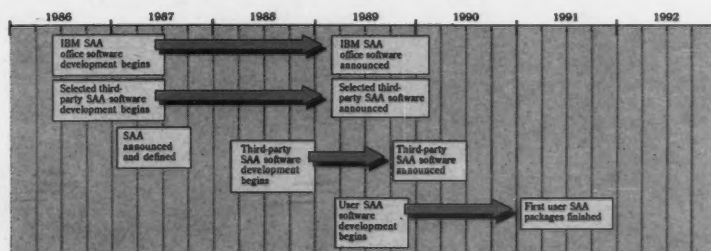
The plan to allow development of applications that can run on every one of IBM's

Continued on next page

Gens is vice-president of technology assessments for the financial services group of International Data Corp. in Framingham, Mass.

SAA TIME LINE

By the early 1990s, users will be developing SAA packages



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CONFORMING TO SAA

IBM must convince customers and third-party software companies to write to the high-level Systems Application Architecture (SAA) interfaces and avoid writing below them, to the operating system or non-SAA subsystems.

Today, there are almost no IBM customers — and, most definitely, no third-party software houses — who write applications only in high-level languages and don't "write down" into lower software layers.

The main reason for this is performance. When writing code for a particular function, it is often more efficient to invoke the operating system directly through a supervisor call or to directly access the storage manager — VSAM, for example — than to utilize higher level interfaces.

Since SAA attempts to mask the differences in IBM's multiple operating systems by providing common services and interfaces, these interfaces by definition must sit above the operating system and its companion core systems software products. SAA, therefore, asks the developer to forgo performance benefits of writing down for the benefit of application portability.

Independent software companies like Management Science America, Inc., McCormack & Dodge Corp., Culinet Software, Inc., Ashton-Tate Corp. and Lotus Development Corp. must weigh this performance-for-portability trade-off carefully.

For Lotus, the benefit of SAA is being able to sell an SAA version of 1-2-3 — not only to the tens of millions of personal computer users but also to the potential hundreds of thousands of Silverlake, or System/38 follow-on, us-

ers and the tens of thousands of 370 users — for minimal incremental development cost.

The problem with this strategy is that if a competitor, such as Microsoft Corp. with Excel, chooses not to write to the SAA interfaces but chooses, instead, to write more tightly to the PC system software, the package's performance could potentially be superior to that of Lotus's SAA product.

Lotus may be able to sell to a broader market, but the competitor, because of superior product performance, may win in the PC market.

Which approach is more profitable? In markets that are not very performance-sensitive, the SAA approach carries significant benefits with minimal risk. The question is: How does one gauge just how performance-sensitive the market is in financial terms; that is, whether a response time that is one second longer than a competitor's will lose a company its market share?

The point here is that deciding whether or not to write to SAA interfaces isn't a "no-brainer." There is risk if a software vendor's major competitors choose not to write to SAA.

The risk is smaller for a market dominator. Thus, Lotus has decided to write an SAA version of 1-2-3. Its 1-2-3/3M, a version of 1-2-3 that will run on 370 processors, is the first independent vendor cut at an SAA product. Many other vendors in "tool and nail" battles for market share will play a waiting game, trying to discern whether and when their competitors will embrace SAA.

Significant competitive risk will likely cause many software vendors to take a cautious stance regarding SAA.

FRANCIS R. GENS

How soon?

FROM PREVIOUS PAGE

strategic processor families emerged from a need to address two large problems:

- The inability for customers to leverage their investment in application software for one IBM processor family (such as the Personal Computer) as they migrate to (or add) processors from another IBM family (such as the System/36).

- The inability for IBM to leverage its investment in application software development for its different processor families. Rather than writing an office automation package once, for use on all IBM strategic systems, IBM must virtually write five OA packages — one for each of the different operating system environments. Needless to say, this is an expensive way to run a computer company.

This fragmentation of IBM's application software base into four or five sub-communities (the different strategic operating systems) not only costs IBM and its customers money, but it also limits IBM's clout in the third-party software community. Firms like Lotus Development Corp. and Ashton-Tate Corp., for example, look at the IBM customer base as only those who own PCs; writing an application for IBM's System/3X base is every bit as large an effort as writing for another vendor's installed base.

If software companies like Lotus and Ashton-Tate — as well as Management Science America, Inc., McCormack & Dodge Corp. and Culinet Software, Inc. — could market essentially the same versions of a package to all IBM customers, it would be even more attractive to write for IBM systems than it is now. This possibility will become more important as Unix and Digital Equipment Corp.'s VMS increasingly challenge IBM's hold on the third-party software community.

The idealized result of SAA is that, by putting an IBM-standard set of SAA services (and interfaces to those services) within VM, MVS, 3X and OS/2, these very different operating systems will look virtually identical to the three important entities that interface with IBM's systems, which are as follows:

- Application programmers using the standard SAA programming tools.
- Applications "looking" for the same compilers and data base management systems that recognize SQL calls.
- Users interfacing with SAA applications that are identical in all four operating system environments.

Hurdles to SAA

If IBM is able to make the SAA services and interfaces identical within all four operating systems (a gargantuan feat of coordination), and if application programmers develop strictly with SAA tools (another very big "if"), the underlying operating system and hardware would be rendered irrelevant to application programmers, applications and users. They would be operating in an "SAA environment," not MVS or VM or OS/2.

While SAA sounds like a terrific plan, it will not be implemented without IBM overcoming several major obstacles. The biggest challenges involve the following:

- Technical issues (providing true portability).
- Third-party cooperation (users and independent software developers).
- Alternative schemes for application por-

ability (Unix, for example).

A fourth issue is timing. How successful IBM will be with its SAA approach depends to a great extent on how quickly it can overcome the three challenges above. To succeed — that is, to establish SAA as a major IBM and third-party software environment, as reflected in a large portfolio of SAA applications — IBM must demonstrate the technical viability of SAA within the next 18 to 24 months by delivering an actual SAA package.

Delivering on the promise

The biggest question about SAA is: Can IBM deliver on its promise of application portability? This question is less about the basic concept of SAA than about IBM's ability to coordinate the different systems software teams responsible for VM, MVS, OS/2 and the yet-to-be-announced 3X operating systems. The challenge is to ensure that each development team is building the same SAA interfaces.

As it promotes SAA, IBM must also face the fact that it is asking customers and third-party software vendors to avoid writing below SAA to the operating system level — even though that means giving up performance. (See story at left.)

It is very likely that the acceptance of SAA as a programming environment in IBM shops will be high, once customers are convinced SAA can deliver on its portability promise. This leads to the next question: When will SAA products (applications that have been written to SAA interfaces with SAA tools) be delivered?

Right now, SAA is merely a plan. This month and last, it became a more clearly defined plan with the release of most of the programmers' reference manuals for the SAA interfaces. During the next year, IBM must release products such as compilers that actually embody the SAA interfaces so that full SAA programming efforts may begin. With those preliminary steps accomplished, IBM, selected software vendors like Lotus, the rest of the software vendor community and customers will slowly begin to bring SAA applications from plan to reality.

The first developer likely to bring an SAA application to market will be IBM itself. When? The answer lies in Milford, Conn., at IBM's new Application Systems Division (ASD).

At ASD, IBM is, among other things, developing the next generation of its office automation software. This new group of products will replace and/or migrate from IBM's Professional Office System, Personal Services and several other current IBM office products.

The goal is to develop a single group of office products using SAA that run on PS/2s, 3Xs and 370s. This development team will truly put SAA to the test; they are writing the new office software in C on a PS/2. If SAA does not allow that code to also run on a 3X and a 370, the ASD developers will certainly be the first to know.

The ASD developers are targeting 1989 as the introduction point for the new software — between one and two years from now. It's important to remember that no schedules slip so easily as software development time frames; the new software could conceivably be delayed until 1990. That is the time period in which IBM — which has known about SAA for roughly two years — will deliver its first live SAA code.

When will other software companies introduce SAA applications? At least one

Continued on page 22

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HOW SOON?

CONTINUED FROM PAGE 20

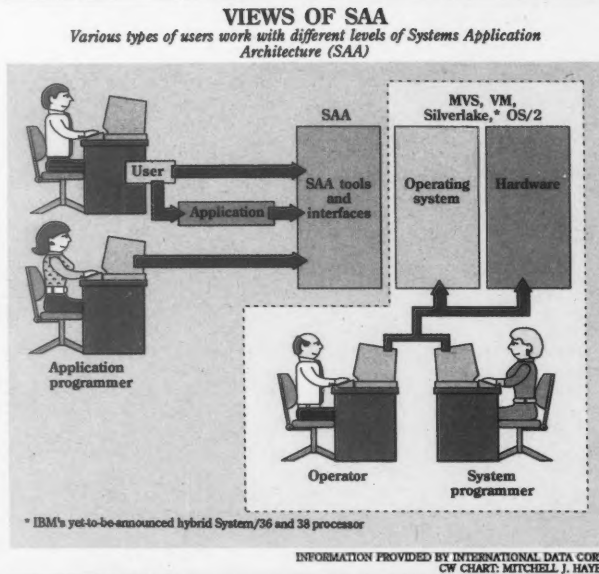
independent firm — Lotus — may be close to IBM in announcing an SAA product.

Lotus is a select vendor, having been given access to SAA information before SAA was even announced. There is a good reason for this move: Lotus is a partner with IBM in the development of IBM's new office software. Lotus's 1-2-3 is the spreadsheet IBM will incorporate into its office system. Earlier this year, Lotus referred to its project to develop a version of 1-2-3 that runs on IBM mainframes as "1-2-3/M." Presumably, Lotus's project is based on writing 1-2-3 to IBM's SAA interfaces.

Word from within Lotus is that it may beat IBM to market with its spreadsheet; that is, 1-2-3/M (and likely, 1-2-3/3X) could be introduced in the 1988-1989 time frame.

Lotus is not the only IBM partner in SAA. Microsoft Corp. is playing a role in the development of the SAA Presentation Manager. One of the components of the Presentation Manager, windowing, is based on Microsoft's Windows. Indeed, Microsoft is participating with IBM in the development of the Presentation Manager component of OS/2, which will conform to SAA. It would not be surprising to see Microsoft as one of the first software vendors to jump on the SAA bandwagon with Lotus.

Software companies that do not have a joint development relationship with IBM will be unable to begin developing SAA applications until the SAA reference manuals and tools become generally available. The first such software companies will



likely come to market with SAA products in the 1990-1991 time frame.

IBM customers may be more inclined than software vendors to make SAA's performance-for-portability trade-off, but they will not do so until a vendor has demonstrated that SAA is more than vaporware. Therefore, it is likely that customers will wait until IBM or Lotus introduces the first working SAA applications before they begin to play with it. Beginning development of SAA applications

in 1989-1990, early customers will be ready to run SAA code in the 1991-1992 time frame.

It is inevitable that some will quarrel that this time schedule is either too optimistic or too aggressive. The most important point, however, is that regardless of when the first SAA applications arrive from IBM or other vendors and customers, it will take four to seven years before a reasonably rich portfolio of SAA applications becomes available.

The benefits to customers and third-party software companies, if SAA works, are obvious and potentially enormous. The risks are perhaps less obvious but every bit as great.

The following are suggestions for how to respond to SAA during the next several years, while it is more spirit than substance:

- While SAA should perhaps be a consideration in a customer's 5-year plan, it should absolutely not be a dominant factor in hardware or software decisions being made in the next year or two.
- While customers should always favor hardware-independent solutions whenever possible, deciding which standards to invest in, and when, will not be completely without risk for years. As a hedge, customers should invest in (or program to) only those interfaces that are at the intersection of SAA and Unix (for example, C) or at the intersection of SAA or Unix and international standards (like ANSI SQL).
- Software vendors and their customers need to recognize that SAA will radically change the competitive landscape in the software market. The application portability of SAA will mean that traditional large system vendors like M&D, Cullinet, MSA and Hogan Systems, Inc. will now be in direct competition with PC software vendors like Lotus, Microsoft and Ashton-Tate. Blood will be spilled.

The best advice for the next few years is "watch." Watch for whether IBM hits its 1989 target for release of SAA office software. Watch for how quickly IBM partners like Lotus and Hogan come to market with their SAA packages. Watch for how big a performance penalty there is, if any, for writing to the SAA interfaces. Watch how the rest of the independent software community reacts to SAA.

THE UNIX ALTERNATIVE TO SAA

For application independence from specific hardware platforms, an alternative to Systems Application Architecture (SAA) is Unix.

One of several major differences between Unix and SAA at the moment is their approach to application independence. Unix attempts to provide hardware independence for applications by tying applications into an operating system that is available, in a few variations, on a wide variety of hardware platforms. SAA strives to provide applications with independence from hardware and operating systems; the applications environment is isolated from the operating system.

One of the benefits of the Unix approach is that by tying the application more closely to the operating system, the developer presumably avoids any performance penalty of having to write strictly to high-level interfaces. The bad news is that standardizing the operating system might limit computer companies' freedom to incorporate unique functions into their systems, as in Tandem Computers, Inc.'s Guardian operating system, for example.

Another important difference between SAA and Unix is that SAA interfaces are currently scheduled to be available for IBM systems only, whereas various flavors of Unix are available for almost every major vendor's systems.

When a large portfolio of third-party SAA applications becomes available, in four to seven years, computer manufacturers other than IBM might opt to incorporate SAA interfaces (which are published) into their proprietary operating systems. This would give them access to SAA applications. The question for these vendors will be this: Does offering support for SAA provide any benefits beyond those of offering sup-

port for Unix? The answer depends on whether maintaining a proprietary operating system gives enough of a proprietary edge to those vendors.

As planned, SAA interfaces would give vendors access to applications without making them abandon their proprietary operating systems. Unix does not currently allow this.

The situation might change, however, if the attempt to provide a standard applications environment for Unix results in an SAA-like environment that is independent of Unix. SAA provides a standard applications development environment for IBM's major operating systems; Unix currently does not. This shortcoming is being addressed by X/Open, an international consortium of computer companies attempting to develop an open, international applications environment for Unix.

If X/Open succeeds in creating an SAA-like applications environment, it may well turn out that the Unix applications environment does not require Unix underneath it. If this is the case, the dilemma that some computer companies now face — wanting access to a large body of third-party applications while maintaining a proprietary operating system — will go away. Vendors will be able to incorporate X/Open applications interfaces in their operating systems without having to support Unix.

An intriguing element of this issue is that the X/Open group is looking at IBM's SAA Presentation Manager as the X/Open presentation manager. This raises the possibility that SAA and X/Open will share many elements. The most interesting scenario is that, over time, they could converge.

This possibility seems improbable now, since there

is no love lost between IBM and the X/Open consortium. There are parallels, however, with IBM's relationship with the International Standards Organization and its Open Systems Interconnect (OSI) networking standards. For many years, IBM's Systems Network Architecture (SNA) and OSI were positioned as rivals. Now, some elements of SNA have been incorporated into OSI, and IBM has stated its intent to make SNA more OSI-like.

All told, the competition between SAA and Unix sizes up as follows:

- For the near term, Unix will be SAA's closest philosophical rival in that the two share the goal of system independence for applications.
- Mid-size computer companies seeking a rich supply of applications software will look first at Unix, but in the long term, they will have the option to implement SAA interfaces as well.
- During the next several years, IBM will attempt to lure software companies into the SAA fold, ostensibly at the expense of Unix.
- By the early 1990s, the real battle for attracting the attention and investment of third-party software houses may well be between SAA and the X/Open environment — not between SAA and Unix.
- X/Open and SAA might share many common elements; it is even conceivable that they will eventually converge.
- While SAA and X/Open show the potential to take center stage in the software wars of the 1990s, they both have a long way to go before they can be considered significant market factors. Today, they are little more than vaporware.

FRANCIS R. GENS

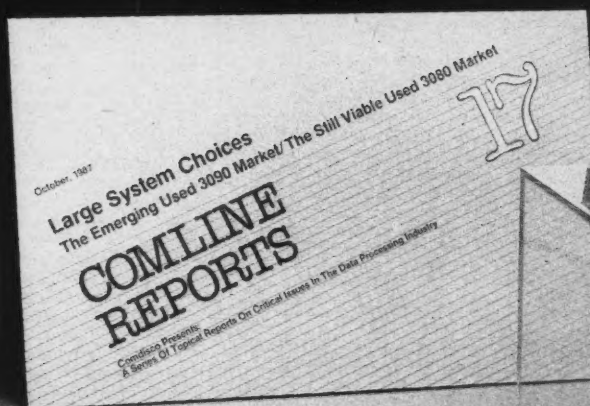
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We can still send you a copy of that case story if you missed it. (Just give us a call). But today, we'd like to share with you the story of another Fortune 500 company and the headaches that the CFO there caused for MIS executives.

It is a story well worth reading. It will help you answer questions your CFO will probably ask you. It could save your company money.

And, if you are like the MIS executive in this story, you may turn out to be a hero.

You will also learn about a new advanced financial software product called FASTAR, which was developed by Corporate Class Software, a subsidiary founded by the \$3 billion Celanese Corporation.

Here's what happened.

The new CFO of a \$2 billion-plus consumer products company had a reputation for toughness that the MIS director soon learned was well deserved.

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There was only one problem. And the MIS executive knew it. What the CFO wanted was simply impossible to do well without a fourth generation language solution. And the MIS executive had enough experience to know what a fourth generation language solution would mean.

TRouble, TRouble, TRouble.

There would be hours and hours of expensive programming and maintenance to support a 4GL solution. And financial analysts still would not be able to work readily with their PC-based spreadsheets.

To complicate matters further, different parts of the existing system kept the same financial data in different formats. The cost of maintaining redundant data that could not be easily shared by analysts was running higher and higher.

A team of MIS executives and financial support personnel soon came to a grim conclusion: Several months would be needed to meet the CFO's demands. And the maintenance problem would grow and grow.

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A DRAMATIC DISCOVERY.

The solution came from a company called Corporate Class Software.

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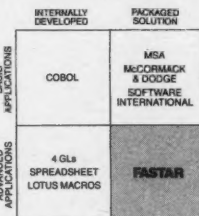
What's more, the CFO now had the flexibility to assign new divisions and product lines to his analysts without taking the time to reprogram the system. FASTAR was built to expand horizontally (for companies) and vertically (for products).

How could all this be done?

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FASTAR acts as a bridge between PCs and mainframe financial production systems, such as the general ledger.

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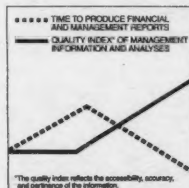
FASTAR is not a tool, but a ready-made solution for advanced financial applications, including financial consolidation and management reporting.

With the proper clearances, analysts can access financial information from any financial schedule for any company in the corporate structure. And they can consolidate and analyze that information without ad hoc programming. (Our powerful analysis package is built in, so there's no fourth generation language or macros programming needed. Even analysts who are computer illiterate can derive the same benefits from FASTAR as anyone else.)

As a result, analysts report more quickly, consolidate more accurately, and analyze more frequently.

One company found, for example, that year-end reports that used to be available in early April, just prior to the annual meeting with shareholders, were now ready in February. And consolida-

tions that used to take two to three days now took hours—with more accurate content. (One way that we've made con-



FASTAR is the packaged solution to advanced financial applications that can provide quantitative and qualitative improvements in your company's financial analyses.

solidations more accurate is through a rigorous system of data checks that automatically check data integrity.)

BRING THE NUMBERS BACK WHERE THEY BELONG.

FASTAR also addresses the critical issue of data integrity and control.

Because FASTAR takes all programming off the spreadsheet, there are no undocumented programs to cause costly mistakes. (One analyst in another company had written a 1,000 line macros program before management pulled the plug. He was the analyst who knew too much.)

FASTAR also eliminates the need for passing data back and forth on pieces of paper and having secretaries or analysts type them into spreadsheets. This reduces the number of potentially dangerous errors that can occur.

And, perhaps most importantly, because all financial information is stored in FASTAR's data base, MIS executives regain control of critical data.

You also protect your company's investment. FASTAR accepts data from fourth generation language products and database management systems, as well as microcomputer applications. (None of the companies using FASTAR needed more than three days to adapt the program to their corporate needs.)

In the final analysis, MIS executives show themselves to be strategic thinkers by giving analysts a tool to be more productive. (Did you know that one company found 85 percent of an analyst's time is spent just looking for data?)

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Circle Reader Service Number 37

WHAT'S STILL MISSING FROM THE 9370

*Some companies are ordering by the hundreds;
others are still assessing their one evaluation unit*

BY ELISABETH HORWITT

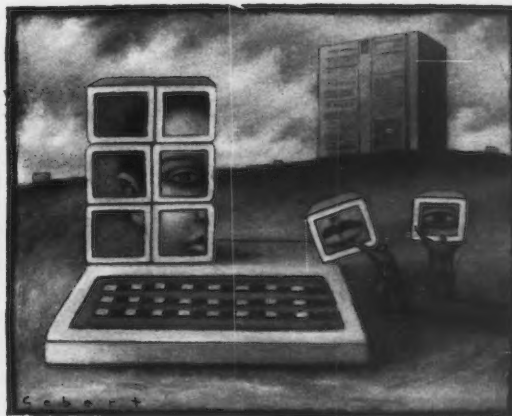
A year after its debut, IBM's 9370 remains something of a mystery box to MIS managers, who are still trying to figure out how — or whether — it will mesh with their companies' computing strategies.

While some companies are reportedly ordering 9370s by the hundreds, other firms have not gone beyond the first evaluation unit. As one manager put it: "We see the 9370 as a future direction. We can see using it here and there, but we have not yet made a clear commitment."

IBM has been clear enough about the various roles it wants the 9370 to play. Slated to be a key component of IBM's three-tiered distributed computing architecture, the mid-range system will act as the liaison between the vendor's traditional Systems Network Architecture (SNA)-based mainframe hierarchy on one hand and networks of IBM Personal Computers and Personal System/2s on the other.

Within that framework, the 9370 is designed to function in a wide range of roles: as communications gateway, local-area network (LAN) server, data base machine, network management node and liaison to other vendors' systems.

But in order to fulfill these demanding



WARREN GEBERT

and often interdependent roles, the 9370 needs sophisticated data access and distributed networking capabilities that its parent is just beginning to announce, let alone deliver. Time and patience are therefore necessary commodities for companies that want to design their distributed computing strategies around the 9370 and IBM's evolving peer-to-peer SNA.

IBM, well aware of this need, has let loose a deluge of communications and data management announcements in the grace

Continued on next page

Horwitt is a *Computerworld* senior editor, networking.

MISSING

FROM PREVIOUS PAGE

period between the system's announcement, in fall 1986, and the first shipments, this past August.

Some of these new products and features were meant to increase the 9370's viability in one or another of its roles; others

were designed to add flexibility and power to the peer-to-peer SNA framework in which the system will operate.

Last June, for example, IBM announced SNA support for the PU2.1 peer-to-peer networking protocol, a VM version of the Netview network management system and VTAM support for the LU6.2 peer-to-peer software protocol under the VM op-

erating system.

Some IBM customers have shown themselves willing to buy 9370 futures if they have the vendor's assurance that the specific capabilities they want are a finite number of months away. Others, however, have expressed frustration that certain elements of IBM's distributed networking and data base architecture are missing, incomplete

or obtainable only through products that IBM is likely to abandon or change radically in the next year or so.

Communications gateway

From its inception, the 9370 has incorporated communications hardware features that make it easier than it was with the machine's predecessors to support a wide variety of communica-

tions protocols.

Built into the 9370 is a communications processor that supports several communications subsystems.

This modular design allows users to mix and match communications protocols — including several non-IBM protocols — simply by switching adapter boards.

For example, the telecommunications subsystem supports synchronous data link control (SDLC), bisynchronous, asynchronous or X.25 adapter cards. The LAN subsystem supports both IBM Token-Ring and IEEE

SOME IBM customers have shown themselves willing to buy 9370 futures if they have the vendor's assurance that the specific capabilities they want are a finite number of months away.

802.3 Ethernet adapter cards.

While IBM 4300 mainframes offer a similar product, called the Integrated Communications Adapter, as an option, they "do not provide the same flexibility of picking exactly what [communications protocols] you want, and they don't have integrated Token-Ring, ASCII or Ethernet connections," says Lon McCauley, a consulting marketing support representative at IBM. For example, an Ethernet interface can be substituted for a Token-Ring interface, or a group of ASCII ports can be replaced by an SDLC or X.25 telecommunications link.

The communications subsystems also make it easier to cost-justify a 9370 as a departmental processor for multiple small remote sites and LANs, since they eliminate the need to install an expensive 3725 or 3720 front-end processor.

The 9370's remote networking features are also designed to fit the budgets of small sites that cannot cost-justify dedicated links to the corporate data center. The mid-range processor is the first 370-like system able to access an SNA network through either multidrop or dial-up lines.

And unlike 370 hosts, the 9370 can hook up to an X.25 packet-switching network directly through the telecommunications subsystem, rather than through a front-end processor.

"Some of my clients are building X.25 networks [of 9370s]

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that handle DEC, Data General, and weird third-party equipment," says Frank Dzubeck, president of the Washington, D.C., consulting firm Communications Network Architects, Inc. "The 9370 can handle all of the asynchronous stuff at the same time it handles IBM bisynchronous and SDLC traffic, so you can [use it as an electronic mail system], offloading it from the mainframe where it has been eating up cycles and storage."

Operatorless office node

The vice-president of one financial institution spoke for many users recently when he said, "Where you need one expert to solve a problem on a DEC system, you need four experts for an IBM system." IBM last June announced several products designed to dispel this common user impression and to make the 9370 a formidable competitor against Digital Equipment Corp. in the office system market.

IBM began by introducing a new version of VM, called VM/IS, that is said to make installation and problem management far easier for 9370 users. In her role as host for the June 16 announcements, Ellen Hancock, president of IBM's Communications Products Division, said a 9370 VM/IS system can be installed in less than half a day.

IBM also announced an enhanced VM Netview, a version of IBM's network management system that allows the 9370 to collect network alerts and other diagnostic data from a local network and upload it automatically to a central 370 running full-featured Netview. VM Netview also eliminates "the majority of routine operator tasks" that exist on a 370, Hancock said.

Once the system is installed, remote management and configuration can be performed by the 9370's Netview Version II interacting with Netview on a remote 370 host. A 9370 running Netview can be preprogrammed to respond auto-

IBM's 9370 SOFTWARE

The company's 9370 subsystems work with some, but not all, of IBM's operating environments

9370 subsystem	Operating system			
	VM	VSE	IX/370	MVS
Telecommunications	VM VTAM RSCS TSAF PVM TCP/IP ¹	VTAM BTAM	No	No
ASCII	VM VTAM	VTAM BTAM	Yes	No
Token-Ring	VTAM TSAF TCP/IP	VTAM	No	No
IEEE 802.3 local-area network	TSAF TCP/IP	No	No	No
Workstation	VM VTAM	VTAM BTAM	Yes	No

¹ Transmission Control Protocol/Internet Protocol

INFORMATION PROVIDED BY IBM

matically to messages it receives from the local network; for example, alarms when network traffic or error rates pass a preset limit or when a local terminal or network interface fails.

Alternatively, Netview II can pass messages on to the central host for storage, analysis or human intervention. Netview II collects network alerts from an IBM Token-Ring by interacting with the LAN Manager through Netview/PC.

It should be noted, however, that IBM provides little in the way of packaged applications that collect and process specific types of network data through the 9370. It is the in-house programmer's responsibility to develop them, using IBM Command-Lists.

Network server

A 9370 running Netview can be initialized, started up or turned off from a remote system and will announce its presence on the network to a remote host as soon as it is turned on.

Once the 9370 is installed and Netview utilities are in place to ensure the continued operation of its network, the question arises as to how local workstations will be able to access the departmental processor, not only as a local server but also as a liaison to resources on the corporate network.

IBM provides a variety of ways for workstations on a LAN to communicate with a 9370. IBM PCs emulating 3270 terminals can access data, applications and peripherals on VM and MVS/XA hosts using IBM's

Enhanced Connectivity Facility. PCs, PS/2s and non-IBM workstations can access data, applications and peripherals on a 9370-based LAN server through two different peer-to-peer networking proto-

cols: IBM's LU6.2 and the de facto networking standard, Transmission Control Protocol/Internet Protocol (TCP/IP).

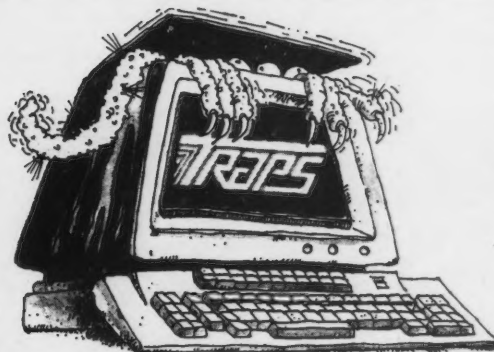
While IBM may support TCP/IP and Ethernet as a concession to manufacturing, engineering and research and development firms that use the protocols extensively, LU6.2 is clearly the vendor's preferred access method for its mainstream systems, including the 9370. Most major computer vendors now support IBM's peer-to-peer protocol, and some IBM shops are standardizing around LU6.2 as a way to link all of their computers — not just IBM's. This summer, IBM opened the way between the 9370 and other LU6.2 devices by announcing VM VTAM support for the protocol. MVS and VSE support was announced as well.

Distributed data base node

If the 9370's connectivity architecture is versatile, its data access scheme remains muddy, reflecting a general confusion in IBM's distributed data base strategy.

The vendor has hinted at the coming of a uniform software architecture that will allow data base subsets to reside on whatever system best suits a given application or user environment, which could be the 9370, 370, PS/2, System/36 or whatever

Continued on next page



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WHAT'S MISSING

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the customer chooses.

A distributed relational data base management system, R Star, is reportedly in the works, but its introduction date remains hypothetical. Meanwhile, IBM has announced a number of data management and data access products whose part in IBM's future distributed architecture remains unclear.

"My sense is that IBM has become much more open about what it wants to do, filling in the pieces of its SNA and SAA [Systems Application Architecture] and even tying them together," says Michael Radick, director of planning and development for the New York State Department of Education.

The department is evaluating the 9370 as a departmental processor for district buildings and libraries around the state but is still trying to get a handle on "all of the recent changes IBM has made to SNA and all of the pieces that are still floating around," Radick says.

The following are among the more important pieces:

• **Distributed Data Manager (DDM)** is an "architecture" — as opposed to a product — that lays out uniform specifications for software that would provide data access across multiple systems while taking care of incompatibilities among disparate IBM data base management structures, storage systems and communications protocols. DDM supports LU6.2 but

does not yet bear the SAA stamp of approval, which would assure its place in IBM's mainstream distributed DBMS architecture.

Currently, DDM does not provide the same capabilities for all IBM systems. IBM 370s, and therefore 9370s, with the vendor's Customer Information Control System/OS/VS can be "target" nodes (that is, their applications and data can be accessible to other systems) but not "source" nodes, whose applications can access other systems' resources. IBM PCs can ask for data but cannot provide it to others. Only System/36s and 38s can act as both target and source nodes.

Shoehorning the 9370 into a traditional hierarchical setup prevents users from setting up a DDM-based distributed system in which data requests are passed back and forth among multiple 9370s.

• **Transparent Services Access Facility (TSAF)** allows CMS applications to access remote resources (SQL data bases, for example) across a cluster of up to eight 9370s. While IBM recently provided SNA LU6.2 support for TSAF, it is not yet part of SAA. Communications Network Architects does not currently

recommend that its clients install TSAF because, Dzubeck says, the software will not become part of IBM's DDM architecture.

"We are looking for DDM to be the total solution of the future" when it comes to providing users with data base access across different-size IBM hosts, Dzubeck says.

TSAF, he explains, is IBM's short-term solution for the 9370 in the absence of a complete DDM product. IBM will not comment directly on TSAF's future or lack of one.

• **Enhanced Connectivity Facility (ECF)** is a micro-to-mainframe link that allows IBM Personal Computers to access applications, files and peripherals on 370 hosts. Although IBM has not yet implemented full

SNA LU6.2 support for ECF, it has indicated its intention to do so in selected environments. ECF was recently made a part of SAA. IBM is also working on ways to connect ECF with DDM, a spokesman indicates.

• **Advanced Peer-to-Peer Network (APPN)**, like TSAF, provides a way for a user to access data across multiple departmental processors — in this case System/36s. However, APPN is not limited

to eight nodes as TSAF is. Moreover, APPN provides some network resource management tools that are lacking in TSAF and in IBM's traditional SNA networking scheme.

APPN's directory feature keeps track of computing, data, peripheral and workstation resources across multiple System/36s so that a user query sent to one System/36 can get routed from one system to another until it gets to the right node. System/36s running APPN communicate with one another regularly. This allows them to update directories as resources and nodes are added, deleted and altered and to reroute queries around failed links.

While APPN currently provides these capabilities for System/36s only, IBM clearly recognizes that certain APPN features, such as nodal self-definition and dynamic reconfiguration of topological and directory flows, are key components of a distributed computing system.

The vendor is currently learning about user needs in these areas from its APPN sites, according to Donald Haile, director of business and systems management at IBM's programming laboratory in Raleigh, N.C.

Whether or not IBM decides to provide 9370 distributed networking capabilities — through either APPN or a similar product — the system will need peer-to-peer networking capabilities. Conspicuous by its absence right now is direct 9370 support for PU2.1. Last June, IBM announced PU2.1 support for 3725 and 3720 front-end processors, opening the

"IBM has become much more open about what it wants to do, filling in the pieces of SNA and SAA and even tying them together."

MICHAEL RADICK
NEW YORK STATE
DEPARTMENT OF
EDUCATION



way for 9370s equipped with front-end processors to act as pass-through nodes for PU2.1 devices. The 9370's Integrated Communications Adapter still cannot support PU2.1 communications.

Additionally, the 9370's tendency to behave like a 370 — that is, as an entire SNA subarea — prevents users from linking more than 255 9370s on an SNA network. This is a problem for customers like the New York State Department of Education, which is thinking about networking several hundred 9370s.

IBM's way around the problem is to use SNA Network Interconnection to link multiple SNA networks. This would allow users to make changes to a network of 9370s without affecting the SNA backbone network, IBM says. Some users and consultants have said that SNA Network Interconnection becomes inefficient when there is frequent communication between nodes on disparate networks.

IBM announced dynamic SNA network reconfiguration, the ability to add or delete SNA devices without having to take the entire network down. But that will only be available through two currently unavailable products: the new version of ACF/VTAM, announced last June and scheduled for shipping in the second half of this year, and a new or substantially revised Network Control Program, which has not yet been officially announced but will be introduced in time to make the ACF/VTAM deadline, IBM says. The revised Network Control Program is also needed to support PU2.1 on IBM front-end processors.

TRYING THE THREE-TIER STRATEGY

While some of its major competitors are racing to install new IBM distributed computing products as soon as they appear, CM Alliance Cos. has taken a wait-and-see attitude toward the vendor's new three-tier architecture.

Eventually, the Hartford, Conn.-based insurance group hopes to install 9370s throughout its agencies as a network server and communications gateway to corporate hosts. But right now, the firm cannot cost-justify "putting a minicomputer between the PC and the mainframe, despite the fact that peer companies are doing it," says Thomas Murray Jr., assistant vice-president of data processing.

CM Alliance is planning during the next year to install IBM Personal Computer local-area networks (LAN) and servers from Banyan Systems, Inc. as a short-term solution for agencies that want to share data and peripherals. Meanwhile, the firm will evaluate one or two 9370 installations from a technical point of view and explore various distributed applications that might justify wider implementation, Murray says.

The firm envisions using 9370s in a variety of roles. As servers, they would provide networked personal computers with file, application and peripheral sharing via IBM's Enhanced Connectivity Facility. The departmental processor would also give PCs access to Professional Office System (Profs) services, including a corporate electronic mail network. "Electronic document distribution is very important to us as a way to stop moving paper and disks between desks," Murray says.

Later, CM Alliance plans to use 9370s as local processors for the Applied Data Research, Inc. (ADR) Datacom/DB data base management system, which recently became CM Alliance's standard DBMS. "You can have a shared data base on

a LAN server, but PC LAN-based DBMSs, while they have made great strides, don't yet equal mini DBMSs," Murray says. Currently, the company uses Datacom/DB on its MVS systems and is waiting for ADR to port the software to VM/SP in order to mesh the DBMS package with Profs.

As it makes its 9370 plans, CM Alliance is keeping in mind that LAN servers, particularly IBM's Personal System/2 workstations, may become at least as functional as minicomputers in a distributed processing environment.

"We're not sure LANs won't develop fast," Murray says, "to take a chunk of the mainframe data base down to the agency, do a refresh on the server and even have updates come back. Even DEC and Wang minis can do this among themselves but not with an IBM host."

The company chose the 9370 after looking at Digital Equipment Corp., Wang Laboratories, Inc. and Data General Corp. departmental processing solutions. "It satisfies our communications and PC-to-host connectivity needs," says director Bill Burrows.

Although CM Alliance was impressed with DEC's All-In-1 office automation system, the company was put off by the necessity of setting up Systems Network Architecture gateways between IBM hosts and DEC systems. "We are an IBM shop," Murray says. "DEC suggested that we distribute our mainframe software on their systems, but we could find no one in our company to champion the migration of 15 years of on-line application development [on IBM mainframes]."

While CM Alliance is considering a distributed computing approach, "using DEC would force us to do it all at once," Murray says. In contrast, the 9370 will allow the firm to distribute applications gradually.

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VENDOR VIEWPOINTS

THE REAL VAX KILLER

BY ROBERT COOK

IBM has a VAX killer, but it's not the 9370. The real VAX killer is the 370 architecture, providing compatibility between machines and software at all levels of the organization. The new 9370 Information System is

getting the attention generally associated with new IBM machines. IBM is calling it the "superminimainframe," while the press and others are taking a bolder approach, with labels ranging from the "mainframe in a file cabinet" to the oft-repeated "VAX killer."

The 9370 was the missing link in what

is now a "seamless" approach to distributed processing, which, in combination with the VM operating system, represents a new and clearly articulated strategic direction for IBM.

Just how 'operatorless' are they?

This approach will significantly affect corporate information management and its associated fiefdoms. Though 9370s in the departmental setting are being positioned as essentially "operatorless," the data

center must play a key role in implementation.

The data center is essentially the arm of the MIS department that serves as the keeper of the hardware, which traditionally has meant a large mainframe from which resources were doled out to competing groups of users.

While having to squeeze the last drop of horsepower in servicing the dynamic needs of the organization has been no easy task, it has brought the data center some control as guardian of critical information resources.

Work group independence

The 9370 changes the picture. Based on 370 architecture, this mid-range machine is an important step toward distributing

.....

THE combined strengths of VM and the 9370 will provide a basis for IBM's goal of automating the white-collar worker.

.....

the corporate information resources throughout the organization. On networked departmental 9370s, each work group can have its own specialized applications, access to the corporate data bases and the ability to share information with other departments.

Furthermore, the 9370 is clearly a VM machine and will take advantage of the interactivity, ease-of-use and communications capabilities of that operating system.

VM will provide the flexible umbrella environment required for effective resource distribution. The combined strengths of VM and the 9370 will provide a basis for IBM's goal of automating the white-collar worker.

Gaining and losing control

Ownership implies control, and the distribution of 9370s into the departments may be an implied threat to the controlling role of central MIS and the data center.

But the control has already been lost to non-IBM vendors in many companies, and the 9370 will provide a means for top data processing management to regain it.

The success of the 9370 mid-range strategy within the organization is contingent on factors that include the adequate networking of machines, appropriate software solutions within each department and the ability to maintain distributed 9370s without adding personnel.

VM and the 9370 are critical tools, but the data center must play a coordinating role in assuring that the ingredients for success are in place.

MIS, however, must be able to transcend the purely technical considerations and work with users to make the strategy work.

The corporate data is usually stored in the central mainframe, but getting it to users in the departments without

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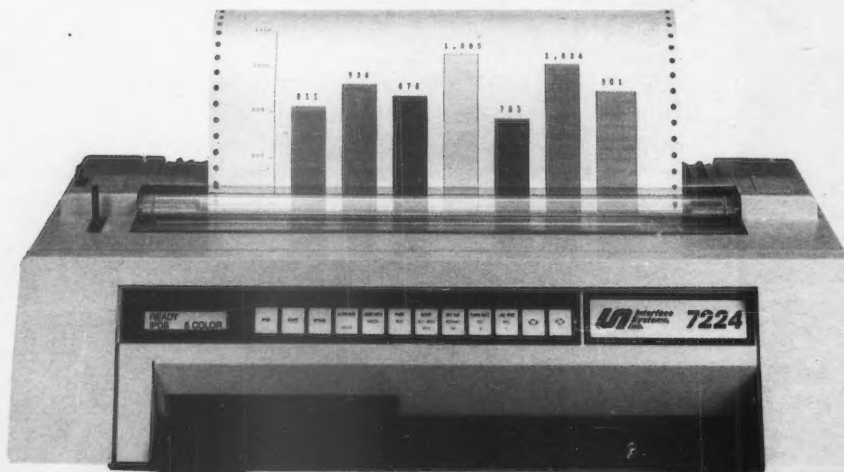
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compromising data integrity and security will require networking from the central site. It will be essential that the data center understand how to coordinate this in order to ensure that organizational standards and users' needs are met.

Distributed processing with 9370s reduces much of the demand on the central mainframe by off-loading specific applications to the individual departments themselves. The accounts payable system, for example, goes into the finance department. The data center is going to need to work with users groups in choosing software that will work well on 9370s while also fitting into the total picture of the organization's distribution of resources. Again, technical considerations must be tempered by the needs of the users.

CHANGING DIRECTION

BY JAN LINDELOW

The challenge facing information systems suppliers today is not so much adapting to what IBM is doing as it is adapting to what the marketplace and users are demanding.

Decision makers and end users are realizing that the quality and efficiency of their information systems are crucial to their competitive success and profitability. This realization has started to prompt users and suppliers to build new relationships that are closer as well as more productive.

The key for suppliers is to understand the user's business thoroughly enough to know how, when, where and why information is essential to his company's success.

The partnership approach

Many suppliers, IBM and Unisys Corp. among them, are implementing a "partnership" approach that focuses on serving specific markets.

Users are also asking for "bridges" of different kinds across a range of workstations and mid-range and mainframe systems.

IBM is trying to address this request through providing more compatibility across its operating systems and through its Systems Application Architecture.

Unisys also sees this need. The broad span of continuity among the company's systems allows users to start with an A series processor and increase the system's capabilities by more than 100 times without changing operating systems or reprogramming.

Where the value lies

The marketplace today appears to be putting the greatest value on what a supplier can do to help users solve specific problems and become more competitive.

The computer industry as a whole is feeling the pressure and is headed toward solving, once and for all, the intricacies of compatibility.

Perhaps because IBM has for so long been the band at the head of the parade, it is taking it a while to recognize that the parade has changed direction.

Lindelow is senior vice-president of Unisys Corp. in Blue Bell, Pa.

OWNERSHIP implies control, and the distribution of 9370s into the departments may be an implied threat to the controlling role of central MIS and the data center.

A major thrust of IBM's mid-range strategy is the operatorless environment, with departmental machines being relatively self-maintaining, which means that technical staffing is not required in remote sites.

The data center's central coordination will be critical as it becomes the overseer of the machines in the remote sites — as

well as the troubleshooter when problems do occur.

The missing link

Careful planning in choosing 9370 machine sizes and software will be a necessary consideration in maintaining overall efficiency.

In addition, system software with ca-

pabilities specific to the VM/9370 environment will provide the missing link in the overall strategy, keeping machines running at their optimum levels, reporting overall performance statistics and exceptions to the data center and, through options that can be tailored to individual situations, enforcing the standards of the data center throughout the organization.

The 9370 will enable the efficient distribution of information resources throughout the organization, from the top down, all within the framework of the 9370 architecture. True office automation has arrived, not surprisingly, in IBM's Year of the Customer.

Cook is chairman and chief executive officer of VM Software, Inc. in Reston, Va.

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ONE-STOP SOFTWARE SHOPPING

*IBM will become to customers
a sort of software supermarket or department store*

.....

BY STANLEY GIBSON

On July 22, a tremor shook the software world as IBM's Application Systems Division (ASD) appeared. Four months later, that new formation is still giving rise to vibrations and aftershocks; the final shape of both ASD and the surrounding landscape remains unclear.

But few believe the software business will ever be the same.

"The goal is to develop and deliver application software that leverages IBM hardware," says ASD President Joseph Guglielmi. The ASD business plan calls for generating both software and hardware revenue as well as profit.

ASD, as its name indicates, is focused on application software and does not include operating system software, which is still handled by the various IBM hardware divisions. In addition, IBM's DB2 operations remain a separate entity and are not grouped under ASD.

Although ASD represents a reshuffling of some previously existing units and is organizationally similar to other IBM business groups, Guglielmi stresses that his division is organized like a classical business, headed by himself as its entrepreneurial president. Within IBM, Guglielmi reports

to Edward Lucente, a vice-president and head of the Information Systems Group.

ASD's job is to see that IBM writes all the software it can and gets others to write what it cannot. In the process, IBM will press both itself and others to standardize software characteristics by conforming to its Systems Application Architecture (SAA).

The result is hoped to be a great number of software packages that will be portable to a number of different IBM processors, thus maximizing software's benefits to IBM hardware sales.

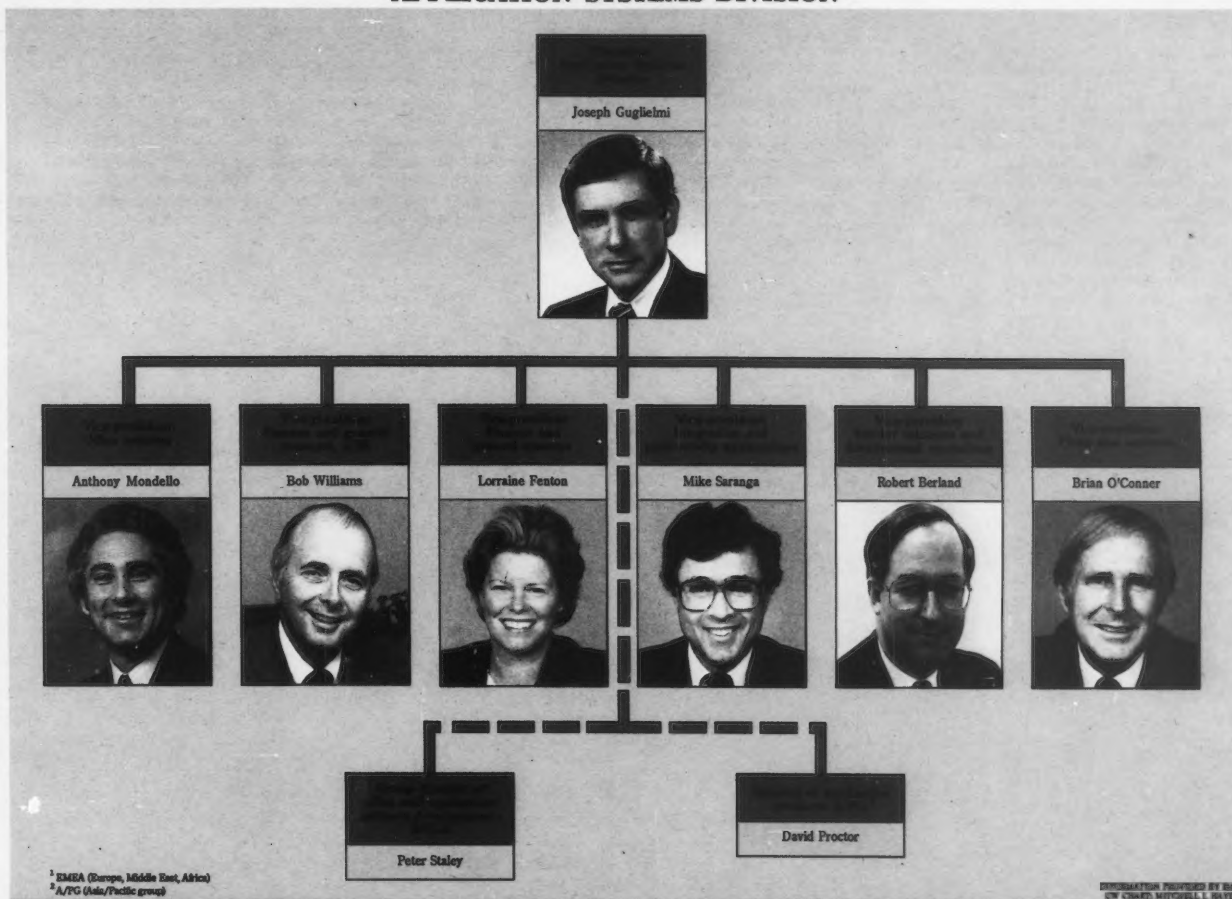
And IBM wants to sell this software itself to a greater degree than ever before, gaining an increasingly large slice of a market that appears to be growing faster than the computer industry as a whole.

In selling software applications that have been created or nurtured by ASD, IBM will become to customers a sort of software supermarket or department store. The company will offer customers a broad line of products and the benefit of one-stop shopping. IBM will control its own product line while selling the wares of others under its own label.

In addition, it will sell third-party products under their own labels and will recommend still others that will be sold independently. Success for all this software,

Gibson is a *Computerworld* senior writer.

APPLICATION SYSTEMS DIVISION



whatever its origin, will be measured according to the same yardstick of growth and profitability, Guglielmi says.

Centered in Milford, Conn., ASD is a global aggregate of six divisions, each headed by a vice-president. Two more group directors reporting to Guglielmi oversee development activities in Europe and Japan.

Although ASD's creation can be traced to a single date, the division did not come into being overnight. Rather, it was made inevitable by a series of industry shifts and a number of prior moves by IBM.

In May 1986, IBM entered a highly unusual exclusive marketing arrangement with Hogan Systems, Inc., a major banking software house. Earlier this year, IBM agreed to a series of cooperative efforts with Lotus Development Corp., including work on 1-2-3/M, a mainframe version of Lotus's popular personal computer spreadsheet program. And the introduction of IBM's 9370 departmental processor a year ago has mandated the creation of a software library to boost that machine's chance of success.

Maximizing the benefits of application software for IBM means balancing internal and external development, a key tenet of ASD's charter and an important challenge for Guglielmi.

"Over time, there is so much more to do than we have skills for," he says, stressing the need for independent com-

panies to keep up their creative efforts.

According to ASD's projections, the applications software industry will grow at a rate of between 20% and 25% annually for the next five years.

Peter Burris, an industry analyst with International Data Corp. (IDC) in Framingham, Mass., agrees, predicting 22% growth. The division's goal, through the combined efforts of IBM and third parties,

"THEIR stated intent is nothing very ominous, but anything that IBM gets serious about strikes fear in the hearts of some people."

MARTIN GOETZ
 SENIOR VICE-PRESIDENT OF TECHNOLOGY,
 ADVANCED DATA RESEARCH, INC.

is to meet or exceed projected industry growth, Guglielmi says.

Burris says the applications software industry's growth rate in the U.S. will be 18%, while the non-U.S. growth rate will be 32%. ASD, with development facilities in England, Sweden, Austria, West Germany and Japan, is well positioned to take advantage of international growth.

Given ASD's straightforward objectives, the response of the software world to its mission has varied remarkably, from welcome to outrage to indifference. Some

observers say it simply cannot succeed.

"Their stated intent is nothing very ominous, but anything that IBM gets serious about strikes fear in the hearts of some people," says Martin Goetz, senior vice-president of technology at Advanced Data Research, Inc.

What people fear is the market leverage of the industry giant. "A preannounced application could hurt competing

vendors," he says.

Dean Redfern, corporate vice-president at McCormack & Dodge Corp., says, "We have been assured by IBM that ASD is not a threat. But I think you always have to have a defensible strategy."

Tom Neas, chairman and president of Cincom Systems, Inc., says ASD makes good sense for IBM. "It's an excellent thing for IBM to do, to get this focus. Bringing it under a common head is the right thing," he says.

In contrast, Bernard Goldstein, a part-

ner at Broadview Associates, a software consulting firm in Fort Lee, N.J., does not greet ASD with open arms. "IBM has benefited from the intellectual and capital expenditure of third parties," he says, "but when it interferes in their natural functioning, it is not in the industry's interest."

Guglielmi and other ASD officials say responses such as Goldstein's are negative overreactions, which they are striving to reverse.

"We want to be attractive to do business with. I want people to know why it's good to work with IBM," Guglielmi says.

ASD has begun to reach out by loaning 9370 departmental processors to developers who express the desire to write software for the machine. ASD will also sponsor educational seminars in SAA, even for those who may have a competitive interest, Guglielmi says.

In addition, ASD is taking unsolicited requests to look at software products.

Robert Berland, vice-president of vendor and development operations for IBM and the man responsible for reviewing product proposals, says he has received more than he can handle. Those without real products need not apply, he says, but those who have unique offerings that have been tested in the market are welcome.

"We consider a good deal with someone else one in which IBM is to share

Continued on page 37

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SHOPPING

CONTINUED FROM PAGE 33

some of the risk as well as some of the reward. It is good for both," Guglielmi says. He cites the agreement between IBM and Lotus as a good example.

John Landry, executive vice-president for application products at Cullinet Software, Inc., says that despite his company's bitter market struggle against IBM's DB2 data base system, the firm is actively discussing areas of cooperation with Berland.

As a distinct, entrepreneurial division and in reaching out to cooperate with others, ASD embodies the "new" IBM. But not everyone thinks it will be easy for IBM to change its nature, if only in a single division. "Applications are built on years and years of direct industry education. I think IBM has got some major fundamental cultural changes to make," M&D's Redfern says.

John Imlay, chairman and chief execu-

"APPLICATIONS are built on years and years of direct industry education. I think IBM has got some fundamental cultural changes to make."

DEAN REDFERN
CORPORATE VICE-PRESIDENT,
MCCORMACK & DODGE CORP.

tive of Management Science America, Inc. (MSA), seconds Redfern's opinion. "They need to develop a software mentality. You need to think like an end user."

"The biggest challenge will be to change the sales force, which is still hardware-oriented," says Stuart Miller, president and chief executive of Software AG of North America, Inc.

Guglielmi acknowledges that he must add a new dimension to IBM's culture and says one of his goals is to reorient the company to accept that applications drive sales rather than insisting that hardware sells itself. He also says that in addition to wanting good software, customers want their software supported. IBM will give small companies credibility they would not otherwise have, he says.

But Redfern, referring to IBM's marketing agreement with Hogan Systems, asks a hard question at the heart of IBM's close participation with other vendors: "If Hogan goes belly-up, will IBM assume responsibility for the lines of code?"

Indeed, even two years after its signing, the Hogan deal is still controversial. While some software vendors perhaps wish they could be "blessed" as Hogan has been, others scoff at such a relationship. "The market was going away from Hogan," Broadview Associates' Goldstein says. "Then IBM anointed them as the best. Others were hurt by this. And it's not good for the user. In the Hogan deal, IBM saves Hogan, but the real loser is IBM."

"IBM's selling efforts have been non-effective," Software AG's Miller says. "IBM's tendency is to go for those companies whose survival is questionable,

even though they say they are going for the best of breed."

Nonetheless, Guglielmi and other ASD officials say there will be more agreements similar to the one with Hogan, although they will not say when and with whom.

Bringing up SAA

A less controversial but equally important role for ASD will be its active promotion of SAA. Responsibility for the definition and structure of SAA is in the hands of Earl Wheeler.

He reports to ASD Vice-President Mike Saranga, who leads the Application Development Systems and Integration division. Saranga's division also handles artificial intelligence activities and the

Cross System Product fourth-generation language.

The importance of SAA is perhaps most apparent in IBM's showdown with Digital Equipment Corp., according to Miller. "DEC has the SAA problem solved. That's 80% of IBM's problem," he says.

But while the need is immediate, SAA will not be in place for some time. "SAA will not roll out in a year," Guglielmi says. Instead, as SAA interfaces become defined during the next several years, they will be made public, and tool kits will be shipped to developers.

"It is a question of degree and time. We are striving to get commonality in our application line," says Anthony Mondello, ASD's vice-president of office systems.

Mondello's office systems division was created in mid-1986 and later grouped within ASD.

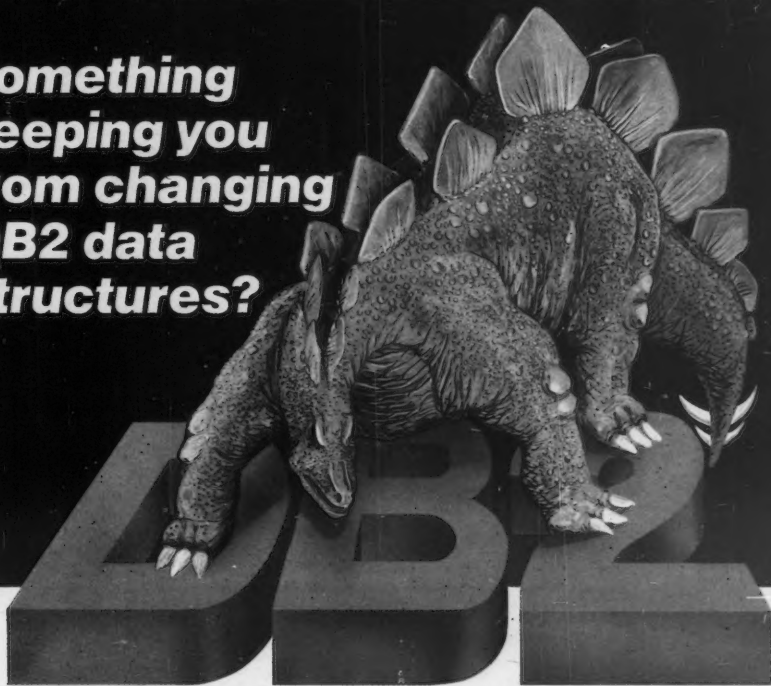
"Each year, there will be more and more in common between applications running on OS/2, System/36 and System/38 and VM," he says. "The goal is to introduce more and more software that looks and feels the same."

Mondello says that since his organization was moved into ASD, there has been no great change in its internal organization. The difference is to be found in interaction with the other departments of ASD.

He points to the benefits of having Berland's group as a primary point of contact with outsiders. The Lotus deal, for

Continued on next page

Something keeping you from changing DB2 data structures?



Changeasaurus—(CHANGE-a-SAU-rus)

It's not that you can't make a change; it's what happens when you do make a change. Changeasaurus, that jealous guardian of the DB2 catalog, is dangerous when provoked. Because of the demands of Changeasaurus, DBAs have spent upwards of 50% of their time battling complex change procedures.

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SHOPPING FROM PREVIOUS PAGE

example, was struck by Berland and later handed to Mondello. Indeed, Berland's function at ASD is much like that of a marriage broker: He will find third-party prospects and pair them with the appropriate vice-president.

In addition to Mondello and

Saranga, other ASD vice-presidents include Bob Williams, in charge of Computer Integrated Manufacturing Systems, including MAPICS and COPICS; Lorraine Fenton, in charge of finance and general systems (such as health, construction and distribution) and dealings with Hogan; and Brian O'Connor, in charge of plans and controls for ASD itself.

Overseeing activities in Europe is Peter Staley, group director of office and application software development for Europe, the Middle East and Africa, headquartered in Paris. In Tokyo, David Proctor, director of application products for IBM's Asia and Pacific Group, monitors developments in Japan.

Mondello, Williams and Fenton say they bring together

within ASD will help them make office, factory and financial applications work together. "If an engineer wants to write a letter, he doesn't want to go to another terminal," Williams says. Conforming to SAA guidelines is a requisite for achieving corporate-wide consistency, the IBM officials say.

SAA guidelines will also make it easier to mix and match appli-

cations created in different countries, IDC's Burris says.

As for third parties, they will need to support SAA in order to play in the IBM world. It is likely, therefore, that all independent vendors — even those that compete with Big Blue — will be dealing with ASD to some extent. "It's going to be a very touchy thing. We are going to work with them and compete with them," MSA's Imlay says.

But not all industry players believe there will be a great change from the status quo.

"Thus far, they have just brought the organization together, but reorganization in itself doesn't solve the problem," Miller says. "If Unisys or HP had done this, it would have been a massive industry yawn."

And contrary to the protestations of ASD officials who say the

"My big question is, What is in this for the customer? I think there will be fewer choices."

STUART MILLER
PRESIDENT AND CHIEF
EXECUTIVE, SOFTWARE
AG OF NORTH
AMERICA, INC.

division will give users more applications, Miller says there will be fewer applications.

"My big question is, What is in this for the customer? I think there will be fewer choices," he says. IBM will find it easier to market a small number of packages instead of a large, confusing array, he explains.

Indeed, Berland says the number of applications in IBM's portfolio has been reduced by about half, from a total of 3,000 a few years ago. He wants to reduce the number further.

But the single most important difference between the way things were before and the way they are now could be Guglielmi himself. Thrust into the spotlight with a critical part of IBM's future riding on his shoulders, the 26-year IBM employee brings a broad resume to his job.

Guglielmi began with IBM in 1961, writing software. He later moved to roles in marketing and distribution. He spent three years in Europe working on the 4300 series of mainframes and, most recently, tracked financial results for IBM's large systems.

Three months into the life of ASD, he says the organizational phase is drawing to a close. Users can now look for results. And Guglielmi talks as if he is hungry for success.

"I am going to be impatient," he says. "I want to get more velocity on the delivery of applications to IBM customers."

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MASTER PLAN FOR THE PS/2

*SAA is the key to IBM's dominance
in corporate microcomputing*

BY JOHN XENAKIS

While Systems Application Architecture (SAA) is still a hazy concept to users and analysts, IBM clearly views it as the blueprint for the company's continuing dominance in corporate microcomputing.

IBM's goal is to crystallize the industry on a set of Personal System/2 software, designed in accordance with SAA specifications, that is consistent with the firm's minicomputer and mainframe products. IBM will then have effectively turned the tables on the competition with regard to architectural compatibility.

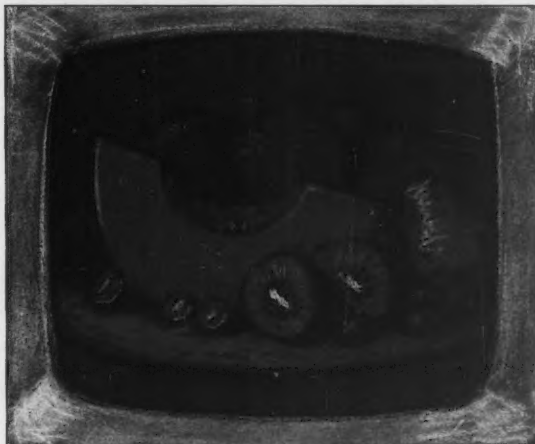
Early signs indicate the industry is heading in the direction that will achieve IBM's aim. Important ven-

dors such as Lotus Development Corp., Ashton-Tate Corp. and Microsoft Corp. are developing versions of their software that will run only under the OS/2 operating system being built by Microsoft and IBM. Many of these packages will use the IBM-standard Presentation Manager user interface or the

SQL data base interface. Both are integral parts of SAA.

IBM has put in place an ambitious program to market micro software products aggressively under the newly created Application Systems Division. The products might be IBM's own or might come from a

Continued on next page



PAUL SCHULENBURG

Xenakis is software editor of *Computer Update* magazine, published by the Boston Computer Society. He is president of Xenakis Consulting Services, Inc. in Framingham, Mass.

PS/2 PLAN

FROM PREVIOUS PAGE

third party. "When we say we can build those application programs," says William Lowe, president of the company's Entry Systems Division, "we mean we can either build them or procure them."

In fact, IBM really couldn't

shut out third-party developers, even if it wanted to. "We simply don't have the resources to do it all, nor do we necessarily have the mental intuition to provide the best," Lowe admits.

Certain specific questions about IBM's strategy become clear when they are placed in the context of SAA:

• Will IBM's OS/2 Standard Edition be the same as OS/2 that

runs on PS/2 clones?

• What is the significance of IBM's OS/2 Extended Edition, and will it run on clones?

• What is the relationship between Microsoft Windows and the Presentation Manager?

"In 1985, we had a major decision to make: whether we would develop a unique operating system or continue the level of dependence we had externally

[on Microsoft]," Lowe says. "Two factors affected our decision. One was that we simply didn't have a great deal of operating system development expertise within the Entry Systems Division. Secondly, a key objective was to maintain a consistency for where we've been. These two elements led us to join with Microsoft in a development contract on OS/2."

The decision to develop OS/2 jointly with Microsoft was one of four separate decisions that IBM had to make in 1985. The other three were all components of the SAA strategy:

• Communications. The new system had to support Systems Network Architecture (SNA).

• Data base. The new system had to provide SQL, IBM's data base access language.

• Presentation. The new system had to have the "look and feel" of other IBM systems and also implement IBM's Graphical Data Display Manager (GDDM), a graphical presentation language used on larger systems.

"In the case of data base," Lowe says, "with the experience that we've had in Santa Teresa, [an IBM laboratory in San Jose, Calif.,] and all the emphasis that we've had on SNA and communi-

.....

"YOU don't make a big investment unless you think you can come up with a better mousetrap."

WILLIAM LOWE
ENTRY SYSTEMS DIVISION

.....

cations protocols, we felt that we could do a better job working with the other IBM laboratories ourselves."

Thus, Lowe decided the two components would be developed entirely by IBM and would be packaged on their own as the IBM OS/2 Extended Edition.

That left one more matter, the Presentation Manager, and that decision could have gone either way; IBM had a proposal to develop it internally and independent of Microsoft.

Lowe says, "Frankly, the functional and performance merits of that [internal] proposal were not superior to what Microsoft was pursuing in its Windows development. So that was one consideration. You don't make a big investment unless you think you can come up with a better mousetrap."

"The second was that we were on the SAA trail, and the three key elements were data base, communications and user interface," he adds.

"We had concluded prior to negotiation with [Microsoft Chairman] Bill Gates that because he already had his Windows product on the market, if he were willing to accommodate the changes that were required to get the look and feel of the SAA interface and accommodate the technical standards associated with GDDM presentation services, that we would not go our own way and try to come up with

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A NEW SOFTWARE PLATFORM

What do industry leaders see on the horizon for PS/2 applications software in the next few years? Here is a sample of opinions:

BILL LOWE, PRESIDENT, ENTRY SYSTEMS DIVISION, IBM

"I see a real revolution in the applications that are coming supported by graphics and image and communications to data bases. I think the big application generators are going to be driven by graphics and interconnected data bases.

"New devices like CD-ROMs and their interaction with using imaging will help our customers provide new services to their customers to help grow their businesses.

"When I go around to customers, what they're excited about is that they can visualize image applications — whether they be airlines with travel agencies or insurance companies who want to be able to use the screen to interface with the customer when he comes in and pictorially show the customer what his alternatives are. The data must be shown graphically, and it must be updated frequently, and it must provide quick answers to questions.

"For instance, we've been working with Sears using CD-ROMs tied to PCs to run their part centers. They can get immediate information on inventory when an order is entered."

ADRIAN KING, DIRECTOR OF PRODUCT MARKETING FOR OPERATING SYSTEMS, MICROSOFT CORP.

"You have much more memory and graphics; people will be able to develop more sophisticated and complex software products. You can combine applications, pass data between tasks and so on. So we expect to see a bunch of very sophisticated applications appearing.

"What those things are going to be, anyone can guess. You can look at office automation systems currently implemented on minicomputers, and that will give you a good idea where microcomputers are going. It's conceivable that there will be more artificial intelligence applications, since if you look at any AI or expert system, one characteristic they all share is that they use gigantic amounts of memory.

"I recently saw a demo of an expert system in which the application used 70M bytes of memory, running on Compaq's Deskpro 386 under Xenix. It had 10M bytes of physical memory, with 60M bytes of virtual memory. That's extreme, but these things chew up memory.

"As a different example, our new announcement of PC Excel will be the first of a new wave of sophisticated application products. If you compare Excel on the Mac with Multiplan on the PC, there's no comparison. But if you compare Excel on the PC with Excel on the Mac, you'll see that the PC version is yet much more sophisticated than the Macintosh version."

JOHN MEYER, PRESIDENT AND FOUNDER, VENTURA SOFTWARE

"Graphics is important to OS/2, but frankly, we have good graphics tools today, like GEM [from Digital Research, Inc.]. To me, the real promise of OS/2 is the power of Unix, with the application base of MS-DOS. And by the power of Unix, I mean two features: The ability to address large chunks of memory and the ability to handle multiple tasks.

"For example, with multitasking and large memories, we can seamlessly integrate several applications, like Ventura Publishing, together with a CAD [computer-aided design] program and authoring program. As for networks, one of the reasons nets have been slow to be accepted

is because most applications don't run any better on a network. However, publishing is an exception; it's probably one of the most important applications for networks, because you can use it for a work group.

"The biggest surprise I've had since the company started was that we had no idea networking was going to be such a highly demanded item. The first thing anyone asks when they buy Ventura is, 'How do I add fonts?' And the second is, 'How do I run it on a network?'"

"Ventura stores a single document in multiple files so that if one person is contributing an illustration and another person the text, then each individual user can work on a component with his or her own word processor or graphics program. In future versions, we'll see that many different people will be able to work on a single document, and Ventura will automatically reformat the document as a whole as each contributor's work is completed."

ED BELOVE, CORPORATE VICE-PRESIDENT OF RESEARCH AND DEVELOPMENT, LOTUS DEVELOPMENT CORP.

"We see OS/2 as the platform for moving ahead with our full line of products. We'll be supporting OS/2, both in character mode and in the Presentation Manager, with our full line of products. In fact, you'll see integrated versions of the new Lotus DBMS and the graphics version of 1-2-3.

"A major development is that OS/2 will allow people to share products, with group application sharing. You can do some of that today with local-area networks, but the multitasking capabilities of OS/2 allow development of group products far beyond what we can do today.

"Lotus DBMS will be a new product, using Presentation Managers and based on the SQL data base facility. It will be oriented toward work groups. SQL is absolutely the way the industry is going, and we believe in standards.

"The new DBMS won't run on PCs running PC-DOS, but given our work group orientation, we will certainly have a solution for those people. In fact, unless there's a technological reason to go to PS/2 and OS/2, we tend to design products for both new and old architectures. And where there's a difference, there'll be a co-existence strategy for both. The real question is, Where will all this performance take us? Some of it will wait for 'golden moments,' someone sitting in his home and saying, 'Maybe we ought to do this.' Someone will come up with the next great paradigm, like Visicalc."

LEON WILLIAMS, PRESIDENT, MICROPRO INTERNATIONAL CORP.

"The new graphics interface presents us with some interesting problems. We'll do some sort of ... WYSIWYG [what-you-see-is-what-you-get] product for Wordstar, but if you want to do it in grand style — make your PC word processor look like a Macintosh word processor — that's a significant development cost.

"Furthermore, changing Wordstar is not very popular with the users. No classic Wordstar user will give up the control keys. For me to go to an icon-based system wouldn't sell to those people. So we've got to cater to both types of users.

"Our large installed base [more than three million copies sold] is both a blessing and a curse. We have less flexibility because we have to satisfy old users. A whiz-bang word processing company that comes out with a word processor in 1989 will have total freedom."

JOHN KENAKIS

a comparable product. He agreed that he would adapt to those standards."

IBM is publishing a specification as part of SAA called the Common User Access (CUA). A CUA document is scheduled to be published before the end of the year for the benefit of applications software developers. According to Mike Maples, director of Software Business Systems for the Entry Systems Division, this specification was used by Microsoft in developing Windows Version 2.0 and Windows/386, both of which implement the IBM user interface.

The net result of this strategy is that IBM's OS/2 Standard Edition will be the same operating system as Microsoft's OS/2 and will be available on Intel Corp. 80286- and 80386-based machines sold by anyone as IBM-compatible clones.

IBM's OS/2 Extended Edition will be available for sale to anyone and will run on IBM's Personal Computer ATs and on

look far less formidable against the consistent micro-to-mini-to-mainframe architecture that will result from SAA.

The Apple and IBM architectures have begun to merge in important ways. On one hand, Windows and the Presentation Manager look a lot like the Macintosh user interface. On the other hand, Apple has increasingly emphasized connectivity of its product with IBM's; it has even endorsed a board for the Macintosh that allows some IBM compatibility, at least to the point of interchanging files on floppy disks.

Another threat posed by Apple is that the company might develop an alliance with DEC and develop an alternative micro-to-mainframe strategy that would compete with SAA.

Proprietary hardware

While IBM is encouraging performance to OS/2 in hopes of establishing an industry standard, the company is taking an opposite stand on the PS/2 Micro Channel.

There is no question that the general industry perception today is that the Micro Channel will be cloned successfully. Many industry analysts say they expect the first clone products to become available during the first quarter of 1988.

Lowe warns manufacturers that might consider cloning without laying the proper groundwork. "We believe that the PC business is really important to our future," he says. "We view the intelligent workstation becoming a window into our future systems environment; particularly through SAA, we're focusing on the development.

"I'm spending, in this division, in the range of \$400 million per year on development," Lowe says, "and over half of that is in the software. The key to us being able to justify that investment is getting a return on it. If, very shortly, people replicate the design that we put out and then offer products without having to recover the development investment I've made, I'm going to be gone very soon."

Lowe says his people regularly purchase and test competitive products that claim to be compatible with IBM products. IBM doesn't test them to see whether they're really compatible ("I couldn't care less," Lowe says.) but to determine whether the competitor has illegally copied IBM's intellectual property.

It would hardly be an overstatement to say that the Micro Channel is very poorly understood, certainly outside, but even within, IT. Although the technical specifications have been published even IBM executives discuss its implications for future applications in the most general terms.

"Given the characteristics of

Continued on next page

IBM is looking forward to the mid-1990s, to an industry that, if the company's strategy works, will have largely adopted SAA.

PS/2s. The fact that it will run on ATs guarantees that it will run on most compatibles — even those that use old bus hardware instead of IBM's new Micro Channel.

IBM is looking forward to the mid-1990s, to an industry that, if the company's strategy works, will have largely adopted SAA. The clone makers will help this important corporate strategy, not hurt it. IBM knows it has less to fear from third-party applications developers and clone developers than from other major system developers such as Digital Equipment Corp.

It is true that IBM is still losing market share to the clone makers, but this fact is irrelevant, the company says. The market share figures include sales of low-end personal computers, a commodity marketplace that IBM has almost completely abandoned. Within IBM's real target marketplace, the Fortune 500, the company's new products give it a decided edge in the continuing fight for market share.

A more fascinating speculation has to do with the future of the Apple Computer, Inc. Macintosh. At the microcomputer level, this system is a formidable competitor to the PS/2, but it

PS/2 PLAN

FROM PREVIOUS PAGE

the Micro Channel," Lowe says, "the [OS/2] Extended Edition will run better on machines that run the Micro Channel. The two main characteristics of the Micro Channel are that it can handle concurrent hardware operations independent of the main microprocessor, and it has a much broader bandwidth than the old PC bus. Also, the Micro Channel has task management in it. It has a life of its own."

Lowe claims that in a communications environment, for example, a hefty 20% to 40% performance improvement is expected from the Micro Channel alone. The reason is that a sophisticated commu-

IT IS even possible that in the near future, true multiprocessing will be available on a single PS/2 computer. In this case, several different processors would be able to access all system devices through the Micro Channel.

nications program would have several different asynchronous tasks to manage.

With the old bus architecture, each communications or other resource request had to be handled directly by the main CPU. But on the new systems, the Micro Channel can prioritize and handle

multiple resource requests from different devices.

It is even possible that, in the near future, true multiprocessing will be available on a single PS/2 computer. In this case, several different processors would be able to access all system devices

through the Micro Channel, which could handle the resource allocation for one CPU without interrupting other CPUs.

Richard Hanrahan, vice-president for programming in the Entry Systems Division, expands this concept to data base management by comparing it to the multitasking capabilities of many operating systems, including OS/2. "One of the tasks will be the data manager. The data manager will start a number of requests against the data bases, and that data transfer goes back and forth while other tasks go on," he says.

Of course, the Micro Channel won't help all applications. If there's only one task running, the Micro Channel won't make much difference, since the data manager will go out and request some data, and then the processor will wait until the data request is satisfied.

"But if in the time it's waiting to go to the file, another application starts, for example, to do some communications," Hanrahan says, "then the Micro Channel can run more of those requests and get more of them running, so we get an overlap in the data transfers and the amount of work the system gets done in total."

For now, the important point is that programs written to run under OS/2 will execute functionally the same on machines with the Micro Channel as they will on machines without the Micro Channel.

According to Entry Systems Division executives, the only difference would be in performance, or speed of execution.

Out with the old

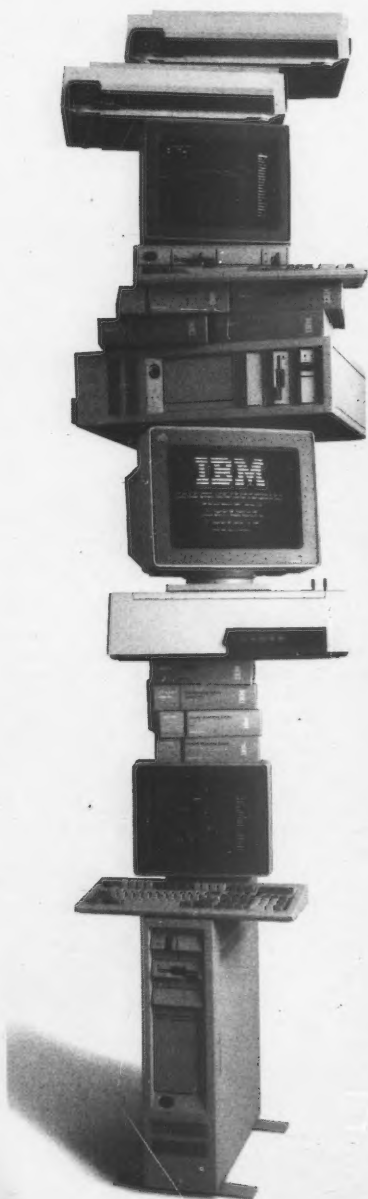
Although there is an enormous amount of software developed for the old PCs, the machines should become practically invisible within, at most, five years. The scenario may be the following:

- The cost to manufacture Intel 386-based machines will go down, moving closer to the cost of Intel 8088-based machines. As a result, no one will want to buy an 8088 machine when he can get vastly increased performance for the same amount or slightly more.
- Within two to three years, all the software currently available on PCs will become available through OS/2. In fact, OS/2-only versions will also become available, and these versions will be substantially more powerful than 8088 versions. They will use multitasking and graphics and will be much easier to use.
- At the same time, the cost to maintain the old hardware will begin to increase, so it will become economically advantageous to upgrade.

The original IBM PC came out in 1981, and that family of computers, including the XT and AT, lasted until 1987. It is, therefore, reasonable to wonder whether the PS/2 family will become obsolete in six more years, around 1993.

Lowe says, "We think we've got enough legs on this system to go five or six years. Our expectation, though, is that we can offer substantially bigger steps of performance and functional improvement on this base in incremental fashion more frequently than we did on the old base."

"The growth in price/performance has always been significant on a year-to-year basis — at least 25% to 50% per year. But we made an especially big jump this year," he says. "The point we've been trying to make with the PS/2 family is that if you look at the product that we offer today, it's two to three times better from a price/performance point of view than the [PC AT] product that we had a year ago."



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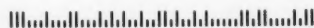
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RISK AND RESPONSIBILITY

*Systems integration — quietly selling
other vendors' products*

BY EDITH MYERS

IBM, a company that rarely acknowledges the existence of competing vendors, is quietly packaging hardware and software solutions for customers that involve sizable amounts of non-IBM equipment. Big Blue is pursuing the systems integration business in a big way.

However, IBM is not actively advertising this new effort in the same manner

Myers is a Hollywood-based free-lance writer.

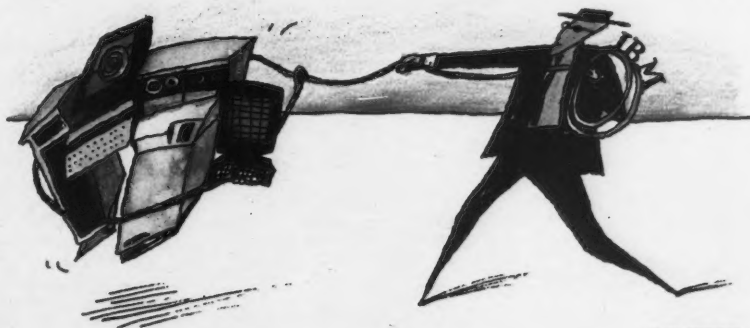
as a commercial systems integration firm might. Generally, IBM's systems integration capabilities are seen as an alternative way to capture an account and are activated primarily in competitive bidding situations, according to Dennis Sigloh, director of systems integration for IBM's Information Systems Group (ISG) in Rye, N.Y.

Instead of operating as an independent entity seeking business on its own, IBM's systems inte-

gration effort relies on the judgment of the field sales force.

"A salesman who feels a systems integration solution is appropriate to a particular customer will discuss it with one of our industry group specialists, someone well-versed in the customer's industry," Sigloh says. "If that specialist concurs, we [ISG] get involved. We decide whether or not a systems integration solution is appropriate,

Continued on next page



BLAIR THORNLEY

RISK

FROM PREVIOUS PAGE

and where it is, we decide where the best skills are available."

The Federal Systems Division (FSD) in Bethesda, Md., has been doing complex systems integration for the government since the mid-1950s. The division is now driven by an expanded charter to meet the same needs of identified commercial accounts.

IBM's current systems integration effort also includes two new groups: Information Services and Systems Integration and Programming Services, both of which are based in Milford, Conn. IBM will also utilize outside systems integrators when

"THERE are a lot of applications for systems integration in state and local government, in things like computer-aided dispatch systems and fingerprint identification systems."

DENNIS SIGLOH
IBM'S INFORMATION SYSTEMS GROUP

it is necessary.

"For a patient-care accounting system, we would probably go to our internal groups, while we might be more likely to look outside for a flexible manufacturing system," Sigloh says. "There is a lot of expertise out there in the computer-inte-

grated manufacturing area."

Sigloh defines systems integration as "the business of adding value by assuming responsibility for combining whatever information products and services the customer requires."

There are two key elements: program

management and risk management.

Program management includes adding value to IBM hardware or software by performing one or more of a variety of tasks. These tasks include designing a system, acquiring some hardware or software from other companies, building customized hardware or software, providing a facilities management capability, training a few thousand end users at remote locations and, finally, developing sophisticated code to tie all of the elements together.

Risk management comes in, Sigloh says, because the integrator, "while performing these tasks, assumes responsibility for all aspects, including the performance of subcontractors, technical performance, meeting schedules, staying within the budget and making sure everything is done to the customer's satisfaction."

IBM's systems integration organizations can become involved at practically any stage in a project's life span. "Sometimes we don't hear about an opportunity until two weeks before a bid is due," Sigloh says.

"Other times," he continues, "we know a year before the bid goes out. Where we have the time, we can get in on the program-definition phase."

Advantageous arenas

Although some commercial accounts are taking advantage of IBM's systems integration services, state and local governments are proving to be the most promising markets.

"There are a lot of applications for systems integration in state and local government, in things like computer-aided dispatch systems and fingerprint identification systems," Sigloh says. "In the telecommunications area, there are things like establishing wide-area telecommunications, building network control centers or integrating voice and text messaging systems."

Most state and local government contracts for large systems require the services of a prime contractor. "They have never been willing to deal with prime contractors and subcontractors bidding separately, so we were not able to respond before because we didn't have systems integration," Sigloh says.

Large commercial accounts, such as United Airlines, tend to be unwilling to discuss IBM's systems integration work because of the strategic advantage they might gain from the services, but smaller public organizations are open about their work with IBM.

Linkage abilities

For example, the North Carolina Department of Public Education, based in Raleigh, N.C., awarded a contract to IBM on the basis of its systems integration capabilities.

When fully implemented, the department's Uniform Educational Reporting System (UERS) will tie together central offices in 140 school districts and 2,000 elementary and secondary schools, according to Tom Runkle, director of the program. The department's central offices and larger schools will act as hubs, with minicomputers installed, while the rest of the schools will use microcomputers.

In many of the central offices, Runkle says, the plan calls for upgrades to obsolete equipment. But 40 offices never had any kind of computer equipment. IBM's

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systems integration contract is for these 40.

The contract calls for installing IBM System/36s in the central offices and establishing communications between them and other machines. The System/36s will communicate with the state's central computer, an IBM 3090, and with IBM Personal Computer ATs and Personal System/2s in the schools.

There were 11 contenders the first time the project went out for bid, Runkle says, and only three the second time: IBM; Burroughs Corp.; and Innovak International, Inc., a Spartanburg, S.C., vendor of school software that was bidding IBM equipment. IBM was chosen as the winner based on functionality and anticipated service as well as price.

IBM's two primary subcontractors on the North Carolina school system contract are J & K Computer Services, Inc. in Mesa, Ariz., which provides payroll and general ledger software, and AMS, a Charlotte, N.C., training company.

Partners and subcontractors

The vendors are typical of the partners IBM works with as a systems integrator. IBM's divisions have joined in contracts with telecommunications companies, software developers, Big Eight accounting firms, data service bureaus, engineering consultants and plant and equipment manufacturers.

Among the consultants IBM has worked with are Arthur Andersen & Co. and Bravo Franco, Inc., a Pittsburgh engineering consulting firm. IBM has also worked with Jervis B. Webb Co., a materials-handling company, on systems for complete plant automation.

Other IBM partners in systems integration projects include Martin Marietta Corp., Boeing Computer Services Co., McDonnell Douglas Corp.'s Information Systems Group and ITP, Inc., a Boston software house.

Work on IBM's portion of UERS began in March and is expected to be completed sometime next year. Runkle says there are still some communications problems to be worked out.

"They have software for communications between the System/36s and the 3090 and between the PC ATs and the 36s, but they don't have anything that makes the PS/2s communicate with the 36s," he says. "That's understandable because the PS/2s were not even in the original system specs because they hadn't been announced. But IBM has said it will have that software, and I'm going to keep writing to them until I know they do."

While IBM's systems integration contract with the school department involves only IBM hardware, with non-IBM software and training, the ratio of IBM equipment to non-IBM equipment in other contracts varies according to customer needs, Sigloh says.

"It could be 95% to 98% IBM, with only the addition of some software," he says. "But at the other end of the range are telecommunications systems, where a lot of cabling would be involved, or plant automation, where the computer required to control and monitor the system is just a small piece of the total system."

IBM is also using its prime systems integration division, FSD, to pursue health-care accounts. FSD recently joined forces with General Electric Co.'s medical systems group to develop integrated diagnostics that tie a hospital's diagnostic imaging systems with its patient information

systems. FSD is also the prime contractor for the implementation of an automated laboratory system for Medexpress in Memphis, formally known as the National Laboratory Center, Inc. The primary subcontractor is Lab Force, Inc., a Dallas-based software company.

The completed system will combine IBM 370 mainframes and PS/2s with a Lab Force software system called Laboratory Management Systems (LMS).

The software is designed to increase the speed and efficiency of analyzing and reporting laboratory specimen test results and to make possible integration of the results in a central information system.

After a year-long vendor selection process, Medexpress chose IBM over Cerner

Corp., a Digital Equipment Corp. OEM, according to Mary Jo Griel, director of information and telecommunications systems for Medexpress. Although she was not directly involved in the selection process, Griel says she believes the choice was based on support, price and functionality.

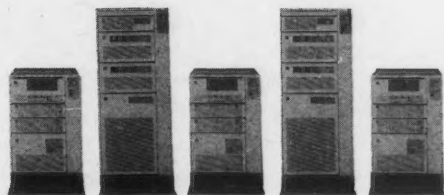
The contract was awarded late last year. System installation is still in process, with completion expected by December. Medexpress was formed last year to be a clearinghouse for laboratory test results, including drug and AIDS testing.

The system will permit large hospital clinics, clinics and other health-care providers to work on-line with a Medexpress data base of test results, integrating them

into their own information systems.

Medexpress had been using Lab Force's LMS software on Prime Computer, Inc. equipment, and part of IBM's task is to manage the conversion of the software to run on the 370 and the PS/2s. IBM plays a managerial role in installation and conversion, while Lab Force handles audits and specific training. Lab Force also monitors the implementation schedule, checking for any customization that might be needed.

Though it is likely to remain low-key, IBM's systems integration effort will expand in the future to wherever the company sees an advantage to be gained by offering management, installation and instruction services in a multivendor environment, Sigloh says.



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Lack of unity endangers the promise of DAT

BY JAMES A. MARTIN
CW STAFF

Although digital audio tape (DAT) is not available yet in the U.S. consumer marketplace, the new media is generating interest among data storage

DAT, or Data DAT (DDAT), as industry insiders call it, promises capacity of up to 1.2G bytes and storage rates of up to 10M byte/min. This represents an improvement over current standard quarter-in. tape cartridge systems with 150M-byte capacity and storage rates of 6M to

7M byte/min.

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Unisys adds 1100/90 models

Product line

BY STANLEY
CW STAFF

BLUE BELL, Pa. — Unisys Corp. announced today that it has replaced portions of its 1100/90 line of computers with new models.

Storage Tech boosts solid-state storage:

BY JAMES CONNOLLY
CW STAFF

LOUISVILLE, Colo. — Storage Technology Corp. last week announced a new solid-state storage device that it claims will be available in the near future.

Codex reveals net management

BY JAMES A. MARTIN
CW STAFF

grated line of communications products.

DB2 advantages require narrow selection

Development benefits over IMS seen

Wang takes Ethernet plunge

BY ELISABETH HORWITT
CW STAFF

LOWELL, Mass. — Wang Computer Corp. announced today that it has entered the Ethernet market with a new line of computers.

MAP users group lays down law

BY KATHY CHIN
CW STAFF

ability gets blown out in the market," said Michael Kolowich, vice-president of corporate marketing and information services at Lotus Corp. The group is preparing a new set of standards for the market.

NEC releases hard-disk Multispeed laptop

WOOD DALE, Ill. — A hard-disk drive of its Multispeed IBM-compatible laptop last week by NEC

electroluminescent supertwist LCD 640K bytes of nonexpandable memory and uses a NEC 486 that runs at either 4.77 or 10 MHz.

SOFTWARE NOTES

Broker workstation tools

Software, Inc. in, will provide a series of intelligent extensions to be provided by Financial Services, Inc., a division of Automatic Data Systems, Inc. The workstation will be designed to replace quote machines with systems that can provide client information, portfolio analysis and modeling options.

IBM slow to remedy DB2 security

Not only is development time for program modifications and maintenance slow, but the time to get a new program installed is also slow. IBM is working to speed up the process.

Continued on page 10

▶ PRODUCTS ◀

THE LAST 12 MONTHS

COMPILED BY
MICHAEL BALL

IBM has flooded the marketplace with product introductions since the last *Extra* magazine on the company, published Dec. 3, 1986. The following list includes selected major announcements based on *Computerworld* articles and research, IBM news releases and analyst opinions. *Computerworld Extra* estimated the performance figures. IBM supplied future shipment dates. Introductions of a series of models announced on one day are grouped, with initial outlook and current status comments for the series following the specifications.

JANUARY 1987

Product series: 3090 Enhanced Models
Model name: 3090 Model 150E
Price: \$1.65 million

Specifications: Upgraded model, with 32M to 64M bytes of random-access memory (RAM), 128M-byte disk and estimated power of 10.1 million instructions per second (MIPS). Unenhanced 150s can only be upgraded to 180Es or higher.

Introduced: Jan. 26, 1987
Ship date: May 1987

Model name: 3090 Model 180E

Price: \$2.6 million

Specifications: Upgraded model, with 32M to 64M bytes of RAM, 256M-byte disk and an estimated 15.6 MIPS. Unenhanced 180s can only be upgraded to 200Es or higher.

Introduced: Jan. 26, 1987
Ship date: May 1987

Model name: 3090 Model 200E

Price: \$4.5 million

Specifications: Upgraded model with 64M to 128M bytes of RAM, 512M-byte disk, two CPUs and an estimated 31.2 MIPS. Unenhanced 200s can only be upgraded to 300Es or higher.

Introduced: Jan. 26, 1987
Ship date: May 1987

Model name: 3090 Model 300E

Price: \$5.6 million (after a \$150,000 cut a month after initial shipments)

Specifications: New model, with three CPUs, 64M to 128M bytes of RAM, 512M-byte disk

Ball is a free-lance writer based in Boston.



The PS/2 Model 30 and Color Display Model 8513

and an estimated 46.9 MIPS.

Introduced: Jan. 26, 1987

Ship date: Third-quarter 1987

Model name: 3090 Model 400E

Price: \$8.38 million

Specifications: Upgraded model with 128M to 256M bytes of RAM, 1G-byte disk, four CPUs and an estimated 61.5 MIPS. Unenhanced 400s can only be upgraded to 600Es.

Introduced: Jan. 26, 1987
Ship date: May 1987

Model name: 3090 Model 600E

Price: \$10.34 million (after a \$600,000 cut one month after initial shipment)

Specifications: New model, with 128M to 256M bytes of RAM, 1G-byte disk, six CPUs and an estimated 79 MIPS.

Introduced: Jan. 26, 1987
Ship date: Third-quarter 1987

Initial outlook for series: Unprecedented price/performance improvements for IBM — 6% to 15% across the line, with increases by upgrading to higher models from 15% to 28%.

"The 600E is an excellent increase in capability and support for the central DP department," says analyst John Logan of The Yankee Group. "But most people are looking for better price/performance, not power."

Current status: A month after shipment, IBM cut prices of the two new models and all upgrades. "The price cuts are really cosmetic," says Bob Djurdjevic of Annex Research, Inc. "It creates a talking point for sales reps." Slow starting sales are attributed to even better price/performance of used 3080s, which many customers perceive as functionally similar to 3090s. "The 3090s offer reasonable price/per-

formance advances but are a hard sell right now," notes George Elling of Oppenheimer & Co. He adds that the market for the 600E and future, more powerful models is small but committed. "There will always be certain accounts that take as many MIPS as you can give them."

Product series: PC Convertible enhancements

Product name: Enhanced LCD

Price: \$250 alone, \$1,995 bundled as part of enhanced PC Convertible

Specifications: Supertwist, antiglare screen, an effort to improve character readability.

Introduced: Jan. 27, 1987

Ship date: Jan. 27, 1987

Product name: Enhanced internal modem

Price: \$450

Specifications: Option for PC Convertible, uses either IBM or Hayes Microcomputer Products, Inc. command sets.

Introduced: Jan. 27, 1987

Ship date: Jan. 27, 1987

Product name: 256K-byte memory card

Price: \$390

Specifications: Allows maximum PC Convertible RAM of 640K bytes.

Introduced: Jan. 27, 1987

Ship date: Jan. 27, 1987

Initial outlook for series: "The Convertible enhancements were overdue," says David Greenblatt, president of DGC, Inc. "It's hard to believe that someone would have come out with a modem that wasn't Hayes compatible to begin with. The only thing the improvements show is that once they [IBM] screw up, they eventually will figure out the problem and fix it."

Current status: As a group, these enhancements brought the basic features up to the level of many popular, lower priced Japanese laptops. But customers were not impressed. "These are things that they should have had in the first place," says Jeff Ehrlich, General Electric Co.'s manager of product technology.

FEBRUARY 1987

Product series: RT Personal Computer 6150s

Series specifications: All 32-bit reduced
Continued on next page

LAST 12 MONTHS

FROM PREVIOUS PAGE

instruction set computer (RISC) machines. Vast improvement in price/performance, storage size and access rate (to 5,810M bytes at 1.08M bit/sec.) in addition to RAM (4M to 16M bytes) and graphics (15- to 19-in. screen with one million pixels).

Model name: RT PC 6150 Model 115 (desktop)

Price: \$10,600

Introduced: Feb. 2, 1987

Ship date: May 29, 1987

Model name: RT PC 6150 Model 125 (floor-standing)

Price: \$16,100

Introduced: Feb. 2, 1987

Ship date: May 29, 1987

Model name: RT PC 6150 Model B25 (floor-standing)

Price: \$17,760

Introduced: Feb. 2, 1987

Ship date: May 29, 1987

Initial outlook for series: "I'm still looking for a real engineering workstation. A beefed up RT is still just a beefed up RT," The Yankee Group's Logan comments.

Current status: "The RT has not received the popularity it deserves," DGC's Greenblatt says.

"I don't see how IBM's going to con-

tinue it," quips Fran Saldutti, an analyst at L. F. Rothschild & Co. "I hope my life is longer than the half-life of the RT."

Product name: Distributed Data Management (DDM)/PC

Price: \$395

Specifications: This product allows PC access to host DDM programs via LU6.2 protocols. But first, the user must program interfaces.

Introduced: Feb. 17, 1987

Ship date: Third-quarter 1987

Initial outlook: Fine for distributed order-entry applications, particularly those already converting to LU6.2. Otherwise, third-party vendors will have to provide DDM-compatible versions of their programs to permit interfacing.

APRIL 1987

Product series: Personal System/2

Model name: PS/2 Model 30-002

Price: \$1,695

Specifications: Two 3½-in. drive, floppy disk-only version of the Model 30-021

Introduced: April 2, 1987

Ship date: April 2, 1987

Model name: PS/2 Model 30-021

Price: \$2,295

Specifications: Fleshed-out Intel Corp. 8086-based PC with improved color graphics, 720K-byte 3½-in. drive and 20M-byte hard disk. It has only three expansion slots and will not be OS/2 compatible.

Introduced: April 2, 1987

Ship date: April 2, 1987

Model name: PS/2 Model 50-021

Price: \$3,595

Specifications: Small-footprint PC AT replacement with 10-MHz Intel 80286-based CPU, 1M byte of RAM expandable to 7M bytes, 1.44M-byte floppy disk drive, 3½-in. and 20M-byte fixed-disk drives and three expansion slots.

Introduced: April 2, 1987

Ship date: April 2, 1987

Model name: PS/2 Model 60-041

Price: \$5,295

Specifications: Floor-standing version of Model 50-021 with 44M-byte fixed-disk drive, expansion to 15M bytes and seven 16-bit slots.

Introduced: April 2, 1987

Ship date: April 2, 1987

Model name: PS/2 Model 60-071

Price: \$6,295

Specifications: The 70M-byte fixed-disk drive version of the Model 60-041.

Introduced: April 2, 1987

Ship date: June 1987

Model name: PS/2 Model 80-041

Price: \$6,995

Specifications: The Intel 80386 version running at 16 MHz, expandable to 16M bytes of RAM. It comes with a 44M-byte fixed-disk drive.

Introduced: April 2, 1987

Ship date: June 1987

Current status: Shipped a month early.

Model name: PS/2 Model 80-071

Price: \$8,495

Specifications: Configuration with 2M bytes of RAM standard and a 70M-byte drive.

Introduced: April 2, 1987

Ship date: June 1987

Current status: Shipped a month early.

Model name: PS/2 Model 80-111

Price: \$10,995

Specifications: Top of the new line, with 20-MHz 80386, standard with 2M bytes of RAM and a 115M-byte drive. Accepts another 70M- or 115M-byte drive.

Introduced: April 2, 1987

Ship date: Fourth-quarter 1987

Initial outlook for line: Aggressively priced by IBM standards. Clone-blocking features include proprietary high-speed MicroChannel bus. Buyers get slightly improved PC-DOS 3.3 and promise of OS/2 multitasking environment capable of addressing 16M bytes of RAM and, in later versions, including a Presentation Manager for the 286 and 386 models. All models come with math coprocessor and

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all but the low end with fixed-disk drives. **Current status:** In its first three months, the PS/2's share of IBM's micro sales to mainframe sites climbed from 18% to 40%, according to Focus Research, Inc. "At the lower end, the PS/2 Models 25 through 50 are selling well," Oppenheimer's Elling reports. "But a lot of customers are waiting for the operating system, particularly the extended one."

Product name: OS/2 Standard Edition
Price: \$325

Specifications: Multitasking for 286 and 386 CPUs, capable of addressing up to 16M bytes of RAM

Introduced: April 2, 1987

Ship date: Version 1.0: December 1987; Version 1.1: October 1988

Initial outlook: Joint development with Microsoft Corp. It should be downwardly compatible with PC, PC XT and AT software but eliminate upward compatibility. Version 1.1 will augment Version 1.0 with Presentation Manager and windowing. This update will be free to purchasers of Version 1.0.

Current status: Unexpected early delivery of Version 1.0 is expected to boost application development. The development kit sold in May for \$3,000 was slow and buggy, causing one third-party developer to "suspend all work until we get a decent copy." Most have faith that Microsoft will trim and debug the operating system adequately and on schedule. "So much of the PS/2 rides on OS/2," says George Best of Systems Consulting.

Product name: OS/2 Extended Edition
Price: \$795

Specifications: To include a data base management system and such communications features as intersystems interconnects and terminal emulation as well as local-area network (LAN) and Systems Network Architecture (SNA) gateway support in a later version.

Introduced: April 2, 1987

Ship date: Version 1.1: November 1988

Initial outlook: "Maybe introducing a machine without an operating system is IBM's forte," DGC's Greenblatt says, referring to both OS/2s and the 9370 without VM.

MAY 1987

Product series: 4381 processors

Model name: 4381 Processor Model Group 21

Price: \$225,000

Specifications: Single CPU with 8M to 16M bytes of RAM and six standard channels, rated at 2.3 MIPS.

Introduced: May 19, 1987

Ship date: First-quarter 1988

Model name: 4381 Processor Model Group 22

Price: \$350,000

Specifications: Single processor with 16M to 32M bytes of RAM, rated at 3.3 MIPS.

Introduced: May 19, 1987

Ship date: First-quarter 1988

Model name: 4381 Processor Model Group 23

Price: \$530,000

Specifications: High-end uniprocessor with 16M to 64M bytes of RAM and 52-nsec cycle time, rated at 4.7 MIPS.

Introduced: May 19, 1987

Ship date: First-quarter 1988

Model name: 4381 Processor Model Group 24

Price: \$890,000

Specifications: Dual-processor machine with up to 64M bytes of RAM, two 64K-byte buffers and 12 channels standard, rated at 7.8 MIPS. The high end is 8% more powerful than the 3090 Model 120E.

Introduced: May 19, 1987

Ship date: First-quarter 1988.

Initial outlook for series: Mid-range line uses 1M-bit chip and fills out gaps between 4381 and 3090 processors. "This beefs up IBM's mid-range and puts them in a better position against DEC," says International Data Corp. (IDC) analyst Richard Mikita.

However, storage limitations may demand a replacement for the line in 1989, according to Arthur D. Little, Inc.'s Oscar Rothenbuecher.

Product name: 3090 Model 120E

Price: \$985,000

Specifications: Has about 75% of the Model 150E's performance at 60% of the price. The first 3090 mainframe priced below \$1 million. It is a 7.5-MIPS model supporting 32M bytes of RAM, expandable to 128M bytes.

Introduced: May 19, 1987

Ship date: September 1987

Initial outlook: This model may get lost in the overlap of 4381 performance. "I wouldn't expect it to be a barn-burner, but the 4381s will sell like hotcakes," pre-

dicts Rick Martin of Sanford C. Bernstein & Co.


JUNE 1987

Product name: VM/XA SP

Price: Monthly fee of \$4,500; one-time charge of \$112,500 for processor Group 30 and charge of \$216,000 for processor Group 40

Specifications: VM operating system for IBM 370 computers, including 3090 Model 600E. It supports six processors, 128 channels, 256M bytes of main storage and 2G bytes of expanded storage. It supports concurrent 370 operations in addition to allowing as many as four guest

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LAST 12 MONTHS

FROM PREVIOUS PAGE

operating systems. Release 2 will offer native SNA support.

Introduced: June 11, 1987

Ship date: March 1988 for Release 1, first-quarter 1989 for Release 2

Initial outlook: "VM is going to continue to do very well, and this product makes it a strategic operating system at the information system level," L. F. Rothschild analyst Charlotte Walker says.

Product series: Netview Release 2

Series specifications: Automates boot-up configurations of target 9370s and permits network changes without shutting down the system.

The 9370 machines manage alerts from workstations attached directly or via a LAN.

Product name: Netview Release 2 MVS/XA, MVS/370

Specifications: Allows entry of Netview commands and message display at an MVS operator console.

Price: \$37,650 for processor Groups 20 and 30, with a \$1,255 monthly fee; \$1,060 monthly fee for 370s

Introduced: June 16, 1987

Ship date: Fourth-quarter 1987

Product name: Netview Release 2 VM

Price: \$9,020 for processor Group 10 to \$36,095 for Group 40, with a \$940 monthly fee

Specifications: Provides an installation option that reduces direct-access storage device (DASD) requirements for distributed Netview systems that do not require a local operator.

Introduced: June 16, 1987

Ship date: First-quarter 1988

Product name: Netview VSE

Price: \$7,860 for processor Group 10 to \$31,440 for Group 40, with a \$655 monthly fee

Specifications: Supports VSE and provides an installation option that reduces DASD requirements.

Introduced: June 16, 1987

Ship date: Fourth-quarter 1988

Product name: Netview/PC

Price: \$2,000

Specifications: Supports Token-Ring and voice networks as well as non-SNA devices.

Introduced: June 16, 1987

Ship date: June 26, 1987

Product name: Netview/PC Version 1.1

Price: \$2,200; Netview/PC users may upgrade for \$200

Specifications: Will be part of Systems Application Architecture (SAA). Handles Service Point Command Service and supports Realtime Interface Co-Processor Multipoint and V.24 and V.25 bis line-switching protocols.

Introduced: June 16, 1987

Ship date: December 1987

Product name: Netview Access Services Version 1

Price: \$11,200

Specifications: Allows users of SNA terminals access to multiple VTAM applications concurrently.

Introduced: June 16, 1987

Ship date: December 1987

Product name: Netview Network Definer

Price: Graduated one-time charges from \$2,240 to \$8,960

Specifications: Menu-driven, interactive network manager. It generates Advanced Communications Function (ACF)/VTAM definitions for SNA and non-SNA devices and distributes them to remote sites.

Introduced: June 16, 1987

Ship date: December 1987

Initial outlook for series: These products address several shortcomings of IBM networking. "Netview is a start," Systems Consulting's Best says, "but their networks are still not as reliable as they should be." "They need a solution like

DEC's," says analyst Rick Sherlund of Goldman, Sachs & Co.

The Netview Network Definer is important to flesh out Netview and ACF/VTAM product lines. This product attempts to facilitate fast adding and changing of IBM networking.

Current status: "DEC still has a big advantage," says Scott Smith, analyst with Donaldson, Lufkin & Jenrette, Inc. "Netview shows that IBM is getting ready but is still not shipping networks."

Product name: Network Equipment Technologies Corp. (NET) Integrated Digital Network Exchange (IDNX) products

Price: From \$25,000 to nearly \$500,000

Specifications: Fault-tolerant high-speed voice/data managers, primarily for T1 digital networks.

Introduced: June 16, 1987

Ship date: Fourth-quarter 1987, Model 20; November 1988, Models 40 and 70.

Initial outlook: Not an IBM product per se; the company will only market the T1 multiplexers. IBM is financing and jointly developing future NET products.

Product series: ACF/VTAM Version 3

Specifications: Version 3 Release 1.2 will allow 9370s or 4361s to be multiplexed. Supports X.25 communications in both and allows peer-to-peer SNA X.25 communications. The VM/SP version will support 9370 Token-Ring. Version 3 Release 2 will support peer-to-peer commu-



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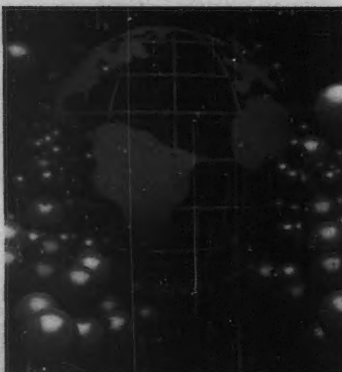
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nications, incorporating the LU6.2 interface for low-entry networking. It also will allow the use of 9370 Token-Ring under VSE.

Product name: ACF/VTAM Version 3 Release 1.2 MVS
Price: \$6,235
Introduced: June 16, 1987
Ship date: First-quarter 1988

Product name: ACF/VTAM Version 3 Release 1.2 VM/SP
Price: \$3,525
Introduced: June 16, 1987
Ship date: First-quarter 1988

Product name: ACF/VTAM Version 3 Release 1.2 VSE

Price: \$963
Introduced: June 16, 1987
Ship date: Second-quarter 1988

Product name: ACF/VTAM Version 3 Release 2 MVS/XA
Price: \$6,255
Introduced: June 16, 1987
Ship date: Third-quarter 1988

Product name: ACF/VTAM Version 3 Release 2 MVS/370
Price: \$5,130
Introduced: June 16, 1987
Ship date: Third-quarter 1988

Product name: ACF/VTAM Version 3 Release 2 VM/SP
Price: \$3,525

Introduced: June 16, 1987
Ship date: Third-quarter 1988

Product name: ACF/VTAM Version 3 Release 2 VSE
Price: \$963
Introduced: June 16, 1987
Ship date: Fourth-quarter 1988

Initial outlook for series: Suddenly allows both hierarchical SNA and peer-to-peer networking when used in connection with IBM's Network Control Program. May blunt DEC's sales pitch that IBM networking requires shutting down for even minor changes.

Current status: "The networking products are nice, but I don't see hundreds of people running to buy them," says Joanne

Meehl of Abington Marketing Associates.

Product series: 3190 series display stations and 3151 ASCII terminals
Model name: 3191 Model D and E
Price: \$1,425 with one-year warranty, \$1,525 with three-year warranty
Specifications: Printer port, screen dump, 24- or 32-col. display and keyboard.

Introduced: June 16, 1987
Ship date: July 1987

Model name: 3191 Model L
Price: \$1,725 with one-year warranty, \$2,065 with three-year warranty
Specifications: Models D and E with light pen.

Introduced: June 16, 1987
Ship date: August 1987

Model name: 3192 Color Display Station Model F
Price: \$2,095 with one-year warranty, \$2,245 with three-year warranty
Specifications: With 14-in. seven-color display, logic element, printer port, keyboard, up to 27 lines by 132 char.
Introduced: June 16, 1987
Ship date: July 1987

Model name: 3192 Color Display Station Model L
Price: \$2,295 with one-year warranty, \$2,620 with three-year warranty
Specifications: Model F with light pen.
Introduced: June 16, 1987
Ship date: August 1987

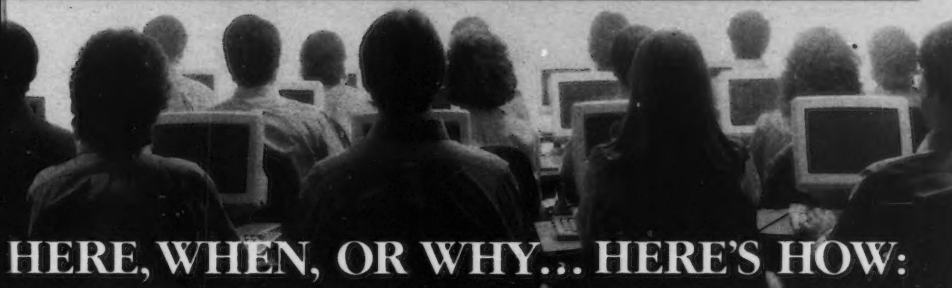
Model name: 3194 display stations
Price: \$2,195 to \$2,895, \$325 for 192K bytes of add-in RAM, \$325 for asynchronous/ASCII host interface
Specifications: For attachment to System/36 or 38 or 9370. Standard with logic unit and 640K bytes of RAM. Includes three keyboards plus one monochrome and three seven-color display options.
Introduced: June 16, 1987
Ship date: August 1987

Model name: 3151 ASCII terminals
Price: From \$399 to \$555, \$50 for DEC VT22, 100 and 52 emulation cartridge, \$25 for Wyse Technology WY-50/50+ emulation cartridge
Specifications: Entry-level and 80- or 132-char. models, all with native and 10 non-IBM emulation modes. They can be used with IBM ASCII hosts, including Series/1 and RT PCs.
Introduced: June 16, 1987
Ship date: June 1987

Initial outlook for series: "It's about time," DGC's Greenblatt says. "Now they have really put the pressure on that market. These are not the traditional \$300 terminals. Suddenly, the market is competing on features, not price."
Current status: The market will remain slow because of the lack of new processors that demand large numbers of such terminals, Greenblatt says.

Product name: VM/IS Release 5
Price: Graduated charges, from \$28,000 for the low-end 9370 to \$106,620 for the high-end 4381, with a monthly fee of \$2,381
Specifications: Minor functional improvements but easy, menu-driven installation and simplified user interface.
Introduced: June 16, 1987
Ship date: July 1987

Continued on next page



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12 MONTHS

FROM PREVIOUS PAGE

Initial outlook: IBM bills this product as "prepackaged VM for small sites." The company hopes to increase 9370 sales with it. "The idea is that you won't need a systems programmer because the 9370 almost costs less than the systems programmer," says consultant Robert Kusch, president of VM/Assist in San Francisco.

Product name: VM/DSNX
Price: Graduated charges, from \$2,880 for the 9370 to \$11,520 for the 4381, with a monthly fee of \$240

Specifications: Automated software distribution and installation from the central DP source. It allows systemwide changes for 370s under VM/SP.
Introduced: June 16, 1987

Ship date: Second-quarter 1988

Initial outlook: IBM claims that it will eliminate the need for programmers at remote sites to handle software changes.

Product series: Personal Typing System

and nonimpact printer.

Initial outlook for series: "It seems to us that the day of the dedicated word processor has passed," says Bruce Jenkins of Daratech, Inc. "It is going to be a tough sell."

Current status: Dataquest's Voss estimates sales through 1987 between 12,000 and 20,000. Early buyers are Fortune 1,000 firms.

JULY 1987

Product name: PC Convertible Model 3

Price: \$1,695 (simultaneous decrease in price of the Model 2 from \$1,695 to \$1,395; upgrade kit with backlit display and new power supply for \$350)

Specifications: Enhancements include backlit LCD screen, new power supply, 3 1/2-in. drives and PS/2 compatibility.

Introduced: July 7, 1987

Ship date: July 7, 1987

Initial outlook: "The portable line doesn't have a hard disk and won't compete with the Japanese products," DGC's Greenblatt says. "Even the price cuts don't bring them down to the same level of comparable ma-

Collegiate Kit (education applications package with Microsoft Windows 1.04, IBM mouse, DOS 3.3, word processing and graphics), floppy disk drive and 128K-byte Memory Expansion Kit.

Introduced: Aug. 4, 1987

Ship date: Aug. 4, 1987

Initial outlook: An IBM answer to Apple Computer, Inc.'s Macintosh for the education market, standard with mouse-driven, fully integrated text and graphics programs. Although aggressive pricing and discounts create "certain opportunities for the Model 25," says senior analyst Michael Goude of The Yankee Group, "I don't think Apple has anything to lose sleep over." Systems Consulting's Best disagrees, saying, "It is definitely going to give them a presence in the academic market if the discounts are anything like Apple gives."

Product name: PS/2 Model 80-311

Price: \$13,995, \$6,495 for second 314M-byte fixed disk drive option

Specifications: Designed as a shared device, standard with 2M bytes of RAM, Micro Channel architecture, 314M-byte fixed disk drive and zero- to two-wait states. It can accept an additional 314M-byte drive.

Introduced: Aug. 4, 1987

Ship date: First-quarter 1988

Initial outlook: Targeted as a server on a network or as a computer-aided design and manufacturing processing workstation; according to analyst Robert Tasker of The Yankee Group.

SEPTEMBER 1987

Product series: 3380 disk drive series

Specifications: Third generation of devices has 4.5M byte/sec. channels, faster seek times and double- or triple-density drives. Both K and J series models are direct-access storage devices. Seek times have been reduced to an average 12 msec for the J and 16 msec for the K model.

Introduced: Sept. 1, 1987

Ship date: October 1987 for drives; third-quarter 1988 for the new controllers (3990s listed below)

Model name: 3380 Model J

Price: \$82,000 for A drive, \$59,000 for each B drive

Model name: 3380 Model K

Price: \$128,000 for A drive, \$105,000 for each B drive

Initial outlook for series: "They showed that IBM was getting back to what they're good at — high-quality, high-volume, reliable, high-performance mass storage devices," says The Yankee Group's Logan.

Current status: Since the PCMs expected the models, they should have their own out within six months, Porter predicts, and will win back some customers attracted to the triple-density drives.

Product series: 3990 drive controller series

Specifications: Faster microprocessors and microcode will improve performance by 10% to 60%, depending on configuration, IBM claims. Models 1 and 2 can be upgraded to Model 3.

Introduced: Sept. 1, 1987

Model name: 3990 Model 1

Price: \$60,000

Specifications: Two-path model with no cache memory.

Model name: 3990 Model 2

Price: \$110,000

Specifications: Four-path model with no cache.

Model name: 3990 Model 3

Price: \$200,000 for 32M-byte cache G03, \$312,000 for 64M-byte cache J03, \$536,000 for 128M-byte cache L03, \$984,000 for 256M-byte cache Q03

Specifications: Four-path model, with standard 48-hour, nonvolatile backup storage of 4M bytes of data. Supports transfer rates of 4.5M byte/sec.

Initial outlook for series: Addition of third and fourth data paths will, according to IBM, improve performance 30% over that of 3880s. "What is important is that the quad-pathing increases the I/O," Dataquest analyst Louise Biggs says.

Current status: IBM is "playing catch-up in cache memory with the 3990." Disk/Trend's Porter says. He adds that some customers will hold off purchasing the new drives until these controllers are available. As for the no-cache models, he sees a solid market in "certain super high-performance applications."

OCTOBER 1987

Product series: System/36 5363 System Unit



Low-end System/36 5363

Introduced: Oct. 20, 1987

Ship date: Oct. 30, 1987

Model name: System/36 5363 Model P10

Price: \$10,995 with preloaded operating system, \$10,000 without preloaded operating system

Model name: System/36 5363 Model P20

Price: \$12,095 with preloaded operating system, \$11,100 without preloaded operating system

Specifications: Compatible with System/36 5360, 5362 and 5364 System Units. Floor-standing system with 1M byte of main storage. System/36 format-compatible 1.2M-byte, 5 1/4-in. diskette drive. Addresses up to 16 local and 64 remote displays or printers. Model P10 has 65M bytes of integrated disk storage. Model P20 has 105M bytes of integrated disk storage.

Initial outlook for series: Replaces the System/36 PC, with performance falling between the 5364 and the 5362. Includes an embedded personal computer, which allows users to save costs by attaching a dumb terminal, rather than a PC, to the system. David Andrews, president of ADM, Inc., calls it "an interim product to carry the bottom end until Silverlake is announced."

Product name: Knowledgepool

Price: \$950 monthly license fee

Specifications: Software program for developing knowledge-based systems in 370 environments. Includes procedural capabilities of PL/I, as well as rule-based constructs and inference capabilities. Available for the following environments: CICS/OS/VS, IMS/VS, MVS/XA, VM/SP and VM/SP/HPO.
Introduced: Oct. 20, 1987
Ship Date: December 1987
Initial outlook: Applications developed with the product are compiled to provide performance faster than that of traditional expert systems.

Product name: VM/SP Release 6

Price: \$500 monthly license fee or one-time charge of \$7,740 to \$30,950 (depending on processor size)

Specifications: Enhanced application support, including file sharing, connectivity, high-level language support and SAA services. Natural language support. Security and bimodal CMS programming interfaces.

Introduced: Oct. 20, 1987

Ship date: December 1988

Initial outlook: Running on a mainframe, the product opens the possibility of CMS file sharing with a 9370 running VM/IS. "The lack of file sharing has been a long-standing thorn in the side of VM users," says Gabe Goldberg, director of technology at VM Systems Group, Inc.



The 8086-based Personal Typing System

Specifications: Fundamentally a low-end PS/2 Model 30 for the secretarial set. The four models are all based on 8086 CPUs and come with keyboard, software, monitor and printer. None is available with a fixed disk. Printers include familiar lift-off correction system.

Introduced: June 30, 1987

Ship date: June 30, 1987

Model name: Personal Typing System Model 1

Price: \$2,895

Specifications: Monochrome display and impact printer.

Model name: Personal Typing System Model 2

Price: \$3,295

Specifications: Monochrome display and nonimpact printer.

Model name: Personal Typing System Model 3

Price: \$3,330

Specifications: Color display and impact printer.

Model name: Personal Typing System Model 4

Price: \$3,730

Specifications: Color display

chines."

Current status: The enhancements have "much improved the Convertible's acceptance in the marketplace," Dataquest analyst Bill Lempersis says.

AUGUST 1987

Product name: PS/2 Model 25

Price: \$1,350 with monochrome display, \$1,750 with color display

Specifications: An 8086-based machine with integrated display, fixed-drive capability and a standard, single 720K-byte 3 1/2-in. drive.

Introduced: Aug. 4, 1987

Ship date: Aug. 4, 1987

Initial outlook: Candidate for high-volume purchases as LAN station working off file and compute servers.

Product name: PS/2 Model 25 Collegiate

Price: \$1,883 with monochrome display, \$1,938 with Enhanced PC keyboard, \$2,338 with color display, \$314 for Collegiate Kit

Specifications: Model 25 with

Product name: CICS/VM
Price: \$1,500 monthly license fee, or one-time charge of \$18,000 to \$72,000
Specifications: Integrated CICS transaction processing for VM/CMS systems. Host connectivity and remote data access. Departmental end-user interface.
Introduced: Oct. 20, 1987
Ship date: May 1988 for Release 1, first-quarter 1989 for Release 2
Initial outlook: The product fills in gaps in the 9370's distributed processing lineup, with transaction processing capabilities, among other features. It might not sustain more than 60 transactions per minute, however, according to The Yankee Group's Tasker.

Product name: VM/IS Release 5.1, including VM/IS Base Release 5.1 and VM/RSP
Price: \$2,381 monthly license fee, or a one-time charge of \$28,200 to \$106,620
Specifications: VM/IS Base Release 5.1 enhanced to include VM/SP Release 5 as well as 12 additional product functions and migration aids from VM/IS Release 5. Offers three optional packages: Transaction Processing Support, with CICS/VM; Support Services; and Application Development Support. Ease-of-installation feature introduced for Network Package, which includes ACF/VTAM, Netview, VSE/VSAM and RSCS.
Introduced: Oct. 20, 1987
Ship date: May 1988, with the migration aids shipping in July 1988
Initial outlook: The product provides increased ease of installation and remote control features for the 9370. Analysts call it a necessary addition for filling out the 9370's capabilities.

Product series: VSE/SP
Specifications: Hardware support for 4381 Model 21, 22 and 23 processors and for 3380 Model J direct-access storage devices. Improved error recovery for the 9370.
Introduced: Oct. 20, 1987

Product name: VSE/SP Version 2 Release 1, Modification Level 7
Price: \$2,160 monthly license fee, or one-time charge of \$23,110 to \$76,475
Ship date: December 1987

Product name: VSE/SP Version 3 Release 1, Modification Level 2
Price: \$2,608 monthly license fee, or one-time charge of \$29,315 to \$102,740
Ship date: March 1988

Initial outlook: Priced the same as previous versions, these products provide support for 4381 and 3380 processors and peripherals.

Product series: Netview
Product name: Netview Performance Monitor (NPM) Version 1 Release 3
Price: Under MVS, \$676 monthly license fee (with initial license charge of \$3,120), or one-time charge of \$22,950 to \$36,720; under VM, \$500 monthly license fee, or one-time charge of \$6,000 to \$24,000
Specifications: NPM is an on-line VTAM application, formerly known as Network Performance Monitor. It now includes VM support, communications and screen enhancements.
Introduced: Oct. 20, 1987
Ship date: December 1987

Product name: Netview Distribution

Manager (DM)
Price: Under MVS/370 or MVS/XA, \$1,920 monthly fee; under VM/SP, \$1,440 monthly fee
Specifications: Netview DM supports network extensions for VM end nodes, with System/36 as an intermediate node and as an end node (connected to the central site via a System/36 intermediate node) and with PC-DOS systems connected to the central site via a System/36 intermediate node.
Introduced: Oct. 20, 1987
Ship date: June 1988 for MVS host, September 1988 for VM node support, November 1988 for VM host

Product name: Netview File Transfer Program Release 1.0 for MVS

Price: For MVS Base, \$500 to \$1,500 monthly license fee, or one-time charge of \$15,000 to \$24,000; for MVS Advanced, \$260 monthly license fee, or one-time charge of \$7,800 to \$12,480
Specifications: Successor to File Transfer Program Version 2.2 for MVS. Offers new operating modes, request queuing, user interfaces, new operator commands and TSO user notification. Supports dynamic creation of sequential target files, standard data compression and user exits. Advanced function set enhancements include support for partitioned data sets, dynamic creation of VSAM files and parallel transmission.
Introduced: Oct. 20, 1987
Ship date: April 1988 for MVS Base, fourth-quarter 1988 for MVS Advanced

Initial outlook for series: The products represent a further beefing up of Netview's functions. "These are necessary missing entities. These tweaks of Netview are going to continue ad infinitum," says Frank Dzubeck, president of Communications Network Architects, Inc.

Product name: 9750 and 8750 Business Communications Systems
Price: Based on price for the 9751 voice/data controller, which ranges from \$158,000 for a 250-line Model 20 to \$790,000 for a 1,500-line Model 40 (A Model 70 system can support 20,000 lines.)
Specifications: Replaces Rolm Corp.'s
Continued on next page

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S7W65

Circle Reader Service Number 55

LAST 12 MONTHS FROM PREVIOUS PAGE

Central Branch Exchange (CBX) Models 8000 and 9000. Features a modular architecture. Uses the same 9000AE processor as the Rolm CBX II 9000.

Introduced: Oct. 6, 1987

Ship date: March 1988 for the 9751 Model 70, November 1987 for other models

Initial outlook: The systems are capable of handling 70% more voice/data traffic than previous Rolm CBXs. The modular architecture enables users to upgrade capacity incrementally.

Product series: Solutionpacs

Product name: Solutionpac Office Series, System/36 Edition, Version 2

Price: Graduated one-time charges range from \$6,810 to \$21,865 for Model 5363 and from \$13,610 to \$34,345 for Models 5360 and 5362. Prices vary according to system configuration and optional software; monthly license fees and distributed system licenses available

Specifications: Workstation attachment options support PS/2 Models 50, 60 and 80. Flexible office software options include the Composite Document Interchange; this feature allows composite documents created by Displaywrite/370 and received by Displaywrite/36 to be printed and included in other Displaywrite/36 documents with fully revisable text.

Introduced: Oct. 20, 1987

Ship date: Fourth-quarter 1987

Product name: Solutionpac Office Series, VM Edition, Version 2

Price: Graduated one-time charges range from \$39,695 to \$111,510 for an entry-level system and from \$190,080 to \$550,085 for a large-scale system. Prices vary according to system configuration and optional software; monthly license charges and distributed system licenses available

Specifications: Token-Ring LAN attachment of PCs and PS/2s. Cross System Calendar Access under the Professional Office System. Optional inclusion of Netview and the Netview Network Definer. Distributed support through VM Distrib-

uted Support System Network Executive. VM/IS Release 5.1 host software base. Composite document capabilities with Displaywrite/370 Release 2 allow users to include graphics output from the Graphical Data Display Manager.

Introduced: Oct. 20, 1987

Ship date: June 1988

Product name: Solutionpac Netview Implementation, Networking Edition

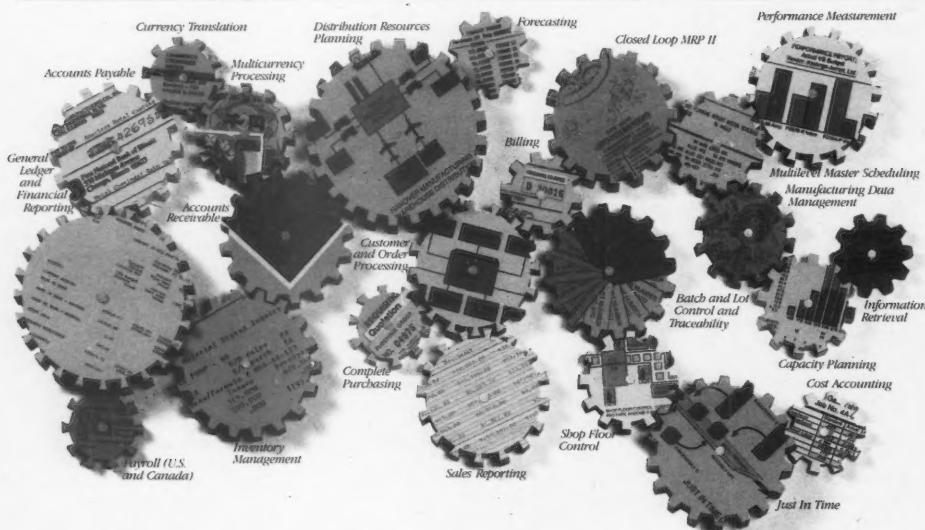
Price: Depends on operating system and processor group; within VM Group 10, basic price is \$21,820

Specifications: Supports installation planning, migration and tailoring. Network management productivity enhancements. Customer education and 90-day remote support.

Introduced: Oct. 20, 1987

Ship date: Nov. 13, 1987, for MVS/XA and MVS/370; first-quarter 1988 for VM; fourth-quarter 1988 for VSE

Initial outlook for series: This product is part of the ongoing Solutionpac marketing effort, which aims to provide a solution for customers who need planning, installation and service assistance.



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Product name: SAA Extension

Price: Not available

Specifications: CICS/MVS and IMS/VS data communications subsystems will participate in the 370 SAA environment by providing elements of the Common Programming Interface (CPI) and enabling programming access to the capabilities of intelligent workstations. The CPI will have a communications interface to provide a consistent application programming interface for writing applications that require a program-to-program connection.

Introduced: Oct. 20, 1987

Ship date: Second- and third-quarter 1988 for documentation and reference manual

Initial outlook: "SNA will be the physical network, and SAA is a good definition for the future logical networks," Forrester Research's Colony says.

NOVEMBER 1987

Product name: OS/2 Extended Edition Version 1.0

Price: \$795

Specifications: Includes features of OS/2 Standard Edition, a relational data base manager and a communications manager. Multiple programming interfaces are also included to aid the conversion of DOS-based applications to OS/2.

Introduced: Nov. 3, 1987

Ship date: July 1988

Initial outlook: Though the Extended Edition is still many months away from delivery, the announcement of dates and the delivery of the Standard Edition in December will help users tolerate the gap between PS/2 and OS/2 availability.

Product name: OS/2 LAN Server Version 1.0

Price: \$995

Specifications: Provides LAN support to interconnected OS/2 Extended Edition Version 1.1 and PC-DOS workstations on Token-Rings and PC Networks.

Introduced: Nov. 3, 1987

Ship date: November 1988

Initial outlook: The server provides a migration path from PC-DOS with IBM's PC LAN Program to OS/2 Extended Edition.

▶ PRODUCTS ◀

THE NEXT 12 MONTHS

BY ALAN RADDING

IBM has traditionally not made it easy for most users to identify — with assurance and well in advance — exactly what the firm's product direction is going to be.

As a result, a core of highly knowledgeable IBM watchers analyzes and interprets every statement issued from Armonk, much as the CIA's Kremlin watchers analyze every word Mikhail Gorbachev speaks and interpret the meaning of everything said or left unsaid in *Pravda*.

Computerworld Extra surveyed leading IBM watchers on what products could be expected during the next year.

The group included Robert Tasker, chief computer analyst for The Yankee Group in Boston; Per Flaatten, information technology research manager for Arthur Andersen & Co. in Chicago; Frederic Withington, an independent consultant from New York; Dale Kutnick, executive vice-president for research at the Gartner Group, Inc. in Stamford, Conn.; Walter Ulrich, a partner at Coopers & Lybrand in Houston; Thomas Davenport, director of research for the Index Group, Inc. in Cambridge, Mass.; Patricia Seybold, president of Patricia Seybold's Office Computing Group, Inc. in Boston; and Shaku Atre, president of Atre International Consultants, Inc. in Rye, N.Y.

On Summit — the next-generation mainframe.

WITHINGTON: "I expect it will be a 370 with a front-end communications processor and a back-end field processor, with attached specialized processors."

Summit will be "a more highly involved architecture with the 370 embedded." The 370 processor will not be replaced but "pushed into the background."

The fully developed machine will be four years in coming; IBM will move in that direction "by degrees" before then. "Next year, there will be one or two Summit modules, such as a communications processor, a parallel scientific processor or a relational data base processor. Summit won't be a single, monolithic replacement for the 3090 but a series of high-performance modules added to the 3090."

At the top of the IBM line, the company will announce some kind of supercomputer, probably a mini-size supercomputer to rival other vendors' \$1 million machines, "maybe in a year."

FLAATTEN: "I don't see much happening with

Summit next year, maybe an announcement. It's pretty far into the future." A "bigger and better box," compared with the current high-end machines, is anticipated — but nothing radical. Improvements in memory and channels are expected, probably the usual 20% performance improvement.

TASKER: "Yes, Summit is coming, but so is Christmas." The announcement should come in the third quarter of 1989.

Summit will offer a 30% to 40% price/performance increase. It will contain a 4M-bit chip and an eight-way or greater (up to 10-way) processor with a front- and back-end processor.

For Summit, there will be good market demand, but it will not be overwhelming. IBM must make the transition for its 3090 users "smooth and transparent." The initial customers will be the 3090s' biggest customers. "There is a hard-core cadre of big users who will place immediate orders."

KUTNICK: "I'm not expecting an announcement on Summit until late 1989."

DAVENPORT: "Clients weren't sure they needed the 3090. I sense there will be the same reluctance about Summit when it finally arrives." Eventually, the big 3090 users will make the transition to Summit, which will be an incrementally more powerful machine.

On the 3090 upgrade — bidding time until Summit.

DAVENPORT: "From the initial announcements, it's quite possible we'll see [an upgraded 3090] in the next year. This seems like the right time."

KUTNICK: "I expect a performance upgrade for the 3090 this year. A performance upgrade for the E models should come particularly quickly, because the new boards [for the E models] are already easily upgradable." As far as reaching 100 million instructions per second (MIPS), "they are already close to it today."

TASKER: "I think we'll see an upgrade. They have an array of new chips." To milk the end of the life cycle of the 3090s, IBM will upgrade to a 2M-bit chip but will hold off from going all the way to a 4M-bit chip. "They won't quite make it like Summit." For the same reason, an upgrade of the 3090 to an eight-way processor is not expected.

Instead, "a 20% to 30% performance kicker" will put the 3090 at more than 90 MIPS. The upgrade may come by the end of 1988, but it is more likely to arrive in the first quarter of 1989.

FLAATTEN: "Depending upon what you want to call it, there will be an upgrade or a price decrease. Either way, you end up with a price/per-

formance gain for the 3090."

There is "demand for [an upgraded 3090] with as much power as they can possibly cram in with the cooling restraints." As many as 100 shops might order such a machine tomorrow. IBM is not likely to extend the machine as high as 100 MIPS. "That is more likely for Summit."

WITHINGTON: "I certainly see an expanded 3090," but it will be a two-step process over the next four years. Ultimately, IBM will increase processing speed by a factor of 10 through the use of superconducting connections between chips. The result could be a 300- or even 400-MIPS machine.

To start, however, faster conventional models should appear beginning in 1989, with a superconducting 3090 in 1991. "IBM is accelerating its semiconductor efforts."

On the low-end 9370 — no consensus.

TASKER: "They will extend the 9370 downward in the next six months and extend it upward in the next 18 months."

WITHINGTON: "There will be [a low-end 9370] for the same reason DEC moved to a little VAX: because of the network users."

DAVENPORT: "Obviously, they'll do it from an architectural standpoint." The primary motivation is the demand for "something on the desk with the 370 in it." A low-end 9370 would be accepted in the market, but this is a small niche, "mostly systems development."

KUTNICK: "It's unlikely they'll go with a low-end 9370. They're more likely to go with CMOS, like DEC." The reason is that IBM cannot cost-effectively build a low-end machine using current technology. "The 9370 Model 20 is already underpowered."

Expect a CMOS version in late 1988 that will be hailed by IBM as a Microvax killer. The machine, however, "will really be in the mid-range. They don't need a lower end."

ULRICH: "They will follow up with better price/performance, but whether there will be a 9370 desktop — not in the next year and a half, but maybe not too long after that."

FLAATTEN: "There is demand for something to outperform the [Model] 20 or 40 at the same price, but it is at least a couple of years away."

SEYBOLD: "They will definitely extend the line downward, but I can't guess on the timing. It will overlap with Silverlake."

On Silverlake — the System/36 and 38 follow-on.

SEYBOLD: "It is definitely coming in 1988, but not before mid-year." The machine will combine the data base capabilities of the System/38

Continued on next page

Radding is a Boston-based author specializing in business and technology.

NEXT 12

FROM PREVIOUS PAGE

with the ease of use of the System/36.

Silverlake will serve as the upgrade for both machines. As a result, "Don't expect to see a new 36 or 38."

TASKER: "Silverlake is being referred to as a convergent machine. I expect it will be announced in February 1988." As a convergent machine, Silverlake will share a common operating system with both the System/36 and 38 machines, including certain code and functions. It is expected to offer enhanced communications. Organizations of 100 people or fewer that have a System/36 or 38 and do not need a 3090 will go to Silverlake. "You top out on the

THE PC AT will give way to the PS/2. Initially, there will be software support for the PC AT, but IBM will expect users to make the transition, ultimately, to the PS/2.

WALTER ULRICH
COOPERS & LYBRAND

38, and you have no place to go."

FLAATTEN: "The Rochester, N.Y., lab has been working on nothing else but Silverlake. Still, before it's actually announced, you never know. I don't think it will be killed." The official announcement should come early in 1988, with first de-

liveries toward the end of next year.

The machine will be a "38 successor with a possible 36-compatibility mode." Rather than have a common operating system, it will advance the System/38 without leaving System/36 users out in the cold. "The 36 doesn't have anything

going for it" as far as upgrading is concerned. If anything, the new machine will look like a 9370 and use the same peripherals but with a different CPU.

ULRICH: "The System/36 and 38 aren't well-positioned anymore. Something has to happen." Silverlake will provide a migration path for 36 and 38 users. IBM is sensitive to these users. The System/36 and 38 have too many customers, making the market too large to be abandoned or ignored.

KUTNICK: "Silverlake will be a true hybrid." From an internal operating standpoint, the machine will be more like a System/38 than a System/36, but it will retain some System/36 characteristics. The machine will have "significant SAA [Systems Application Architecture] capability and utilize SQL."

DAVENPORT: "Silverlake would clear up at least half the confusion. Unfortunately, the 36 and 38 are not one line. They are not very compatible." There is a lot of adherence to the System/38 architecture within IBM, but "the 38 stands alone in the rest of the world."

It would be useful if IBM made Silverlake "look like a 36 with upgraded 38-type power," but most experts expect the machine to be a System/38 upgrade with System/36 emulation. Overall, the 36 and 38 lines represent a growth segment for IBM. "When you are talking about the 370 line of the future, the 9370 is where the interest is."

WITHINGTON: "Silverlake is where IBM promises the 36 and 38 come together in some way." Don't expect a single processor. Instead, the machine will follow the System/36 or 38, with emulation of the other machine "in a degraded mode." The new machine is likely to be a System/38 with System/36 emulation "to help 36 users so they don't have to switch cold turkey."

On the multiuser PS/2 — the jury is still out.

WITHINGTON: "They won't do a multiuser PS/2 if they can sell the [System/36] and VS machines as terminals."

DAVENPORT: "The market is still digesting the power of the PS/2 line. The jury is still out on how much multiuser capability the current line has." Because of that, don't expect IBM to tinker with the PS/2 line in the coming year.

As far as the original PC lines go, "the PC and XT are pretty much gone except for the clones. As the office standard, the AT should stay for another few years." The departure of the AT in the face of the PS/2 may not be graceful. "There will be a period of two separate architectures."

KUTNICK: "As far as power, the PS/2 is well beyond the System/36." Don't expect a multiuser version or a power increase in the next year.

ULRICH: "Users have a tremendous thirst for computing power." The PS/2 line will be upgraded, but not in the next 18 months. Ultimately, the PC AT will give way to the PS/2 system because "customers recognize the need for more horsepower." Initially, there will be software support for the PC AT, but IBM will expect users to make the transition, ultimately, to the PS/2.

FLAATTEN: "I'm a little bit hesitant to make any prediction while we're waiting
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THE LIFETIME OF A CPU

BY JACK VAN KINSBERGEN

A typical large user will by 1989 have installed 1,000 million instructions per second (MIPS) of CPU power as well as 10,000 megabytes (10G bytes) of main storage and 6,000 megabytes (6G bytes) of direct-access storage device (DASD) storage. The ratio of DASD to MIPS will be 6-to-1 in 1989; it was 3-to-1 in 1984.

Users need to predict when to install new CPU power. A major part of the decision involves financing: evaluating lease vs. buy. There are regular signposts that can lead to reliable decision making.

How many people have acquired a CPU very late in its product cycle and ended up being stuck with it or unable to acquire new hardware because of the financing arrangement on the current equipment?

The issue is to define a CPU's useful life and secondary market value such that you can minimize budget impact but maximize your flexibility to react to opportunities.

A key component is determining the useful life of the current equipment. This value is a function of three items:

- How long the current capacity will hold out.
- What the organization's policy is on staying technologically current.
- How quickly the vendor will introduce a new CPU.

How many people have acquired a CPU late in its product cycle and ended up being stuck with it?

Two premises help forecast the future of IBM processors. First, the introduction of processors is driven by a requirement to maintain factory capacity in support of revenue. Second, market values for used equipment are a direct function of the introduction of new equipment.

New equipment from IBM goes through four stages of useful life:

Stage one. The product is in full production by IBM, and there is no successor announced.

Stage two. IBM has shipped the succeeding-generation computer to its first customer.

Stage three. The succeeding-generation machine has achieved full production; that is, the new generation has reached its first stage.

Stage four. A third-generation machine has reached its first stage.

The announcement date is not mentioned because it is not as important as the first customer shipment or the state of full production. That is, the announcement date does not change the availability constraints on current equipment; there is no replacement available.

The secondary marketplace puts a different value on a CPU product in each stage. In the first, the product is worth approximately 85% of list value, as it is still in new production. At the second, the current system is still worth 60% or 70% of its price, since the new CPU is not readily available. The secondary market for the current system drifts off rather than plummets, primarily because the system is still the most available processor.

At the third stage, the CPU is down to 30% or 40% of IBM's price, since a new system is readily available. At this point, the marketplace

adjusts the price/performance curve for the old system. And at the fourth stage, the old system is practically worthless as it is now two generations behind.

Look smart

If you can predict when IBM will reach peak production on a next-generation CPU, you can judge when the market valuation of an installed CPU will fall to 30% or 40%. In order to accomplish this, you need to look at IBM product history. There are three key points established for each product line:

- Announcement date.
- First customer ship date.
- Onset of full production.

For the 360, 370 and 3030 series, the production cycles occurred every four years without fail: 1967, 1971, 1975 and 1979. The announcement dates and first customer ship dates varied from those four-year patterns, but IBM still made its production targets.

If you look, for example, at the 370/155 or 370/165 in terms of the four-year cycle, you would anticipate an announcement in 1968. Actually, in 1968 IBM announced the 360/85 and 360/195, systems that were less than successful. In fact, when the 370/165 finally surfaced, it was merely a 360/85 renamed. The other anomaly would be for the expected product introduction for 1976. The 3030 announcement did not occur until 1977.

The lesson is that IBM will always hit its production cycle dates but will not announce until it knows it is ready to announce. In fact, there will be enough parallel engineering activity going on that even if IBM changes its mind, it will still make its production dates.

Mainframe product lines will last eight years and will have two major announcements apiece, the second of which is a mid-life kicker. Each succeeding machine at the high end will be roughly twice as powerful as its predecessor.

IBM will maximize its CPU production approximately every four years, although the schedule might be accelerating slightly. Announcements should follow the pattern, but the pattern will sometimes fail, as IBM will not announce before it is ready.

A user should project useful life and residual value of CPUs such that the value falls to roughly 30% about the time IBM is expected to introduce its next system.

The later, the steeper

The point is that the later in the product cycle you acquire a system, the steeper the depreciation line must be in order to reach the 30% point. At that point, it should be easy to determine whether the depreciation line makes purchase advisable or whether a lease or rental is more appropriate. Late in a product's life, it might be appropriate to buy a used machine to tide you over rather than make the commitment at the tail end of the cycle.

In many cases, users have stumbled in evaluating the financial considerations associated with the acquisition of new equipment. The biggest impact is the inability to move to new technology when it becomes available.

IBM is a manufacturing-driven company and makes its money from mainframe systems. If you understand this point, you can evaluate alternative hardware configurations — not just from a capacity point of view but from an acquisition point of view as well.

Van Kinsbergen is senior vice-president and chief technical officer at Bools and Babbage, Inc. in Sunnyvale, Calif.

NEXT 12

FROM PREVIOUS PAGE

for Microsoft to deliver on OS/2." IBM wants to make its PC proprietary, which would mean taking over the operating system from Microsoft Corp. — especially if the company is significantly late in delivering OS/2. This scenario, however, "is far in the future."

SEYBOLD: "There will be a multi-tier version, or at least a manager version: a server for a local network." By mid-1988, the OS/2 applications will start being announced, along with an OS/2 version for the LAN Manager.

Third-party vendors are likely to support the PC family because of its large installed base, but IBM will migrate business users to the PS/2 line in the next two or three years.

On a new release of DB2 — great expectations.

ATRE: "They will have DB2 Release 4 in early 1988, February or March." By then the installed DB2 base will have grown from 1,600 to 2,000.

The new release will correct some shortcomings of the current version, particularly referential integrity. Just as significantly, don't expect any announcement concerning R-Star or Starburst distributed data base features in 1987. IBM may announce next month when OS/2 Extended will be available.

Possible upgrades to DB2 include QMF, which can be used for queries and report generation, and ECF, which connects micros to mainframes through SQL. The announcement of QMF may come in the first half of 1988, and the announcement of ECF may be made in the second half of the year.

SEYBOLD: "There will be a gradual migration to a distributed data base by 1990." IBM will take intermediate steps, enhancing and upgrading DB2.

TASKER: "Surely there will be an upgrade coming. I expect some activity in the next 10 to 12 months." IBM may rebundle a new version of DB2 in the MVS

operating system.

WITHINGTON: "There will be some kind of upgrade, but I don't know what. DB2 is IBM's darling." IBM will pour every resource into an improved version, but such software would need better hardware support than is currently available. "They need something to run it faster, maybe parallel processing."

DAVENPORT: "There will be an upgrade in terms of ancillary features" such as improvements in speed, a data dictionary and security. A major overhaul of the program, however, is unlikely. "It will be quite a while before you see, for instance, airline reservations on DB2."

KUTNICK: "You can expect an

"YOU can expect an upgrade of DB2 every six to nine months."

DALE KUTNICK
GARTNER GROUP, INC.

upgrade of DB2 every six to nine months." In 1988, there should be a 25% performance boost, improvement in referential integrity and better security.

FLAATTEN: "An upgrade is coming, with some increase in performance." Regarding rumors of a repository in beta test in Europe, "I disbelieve European rumors — but not totally. It's badly needed, but they've cried wolf so many times."

On an MVS expert system — it's in the works.

ATRE: "I don't expect an MVS expert system this year. IBM has its hands full with SAA," which is still a phantom program itself. The problem with IBM's expert systems, in general, is that they require too large a machine. State-of-the-art developers who use expert systems do their work on smaller machines.

KUTNICK: "You won't see an expert system next year." MVS already has an expert system that

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NEXT 12

FROM PREVIOUS PAGE

fits underneath it. What you will see is automated operations late in 1988 or early in 1989.

DAVENPORT: "The plan was to put in an expert system." The system may well be in beta test now and may very likely be seen in 1988.

WITHINGTON: "They already demonstrated an expert system for MVS at the Yorktown Heights, N.Y., research facility several years ago," and an expert system applied to scheduling will be coming soon.

TASKER: "I expect an expert system. It is a response to DEC." A version of MVS with the expert system should be available during the second quar-

ter of 1988 or early that summer.

SEYBOLD: "An expert system makes sense." Artificial intelligence is already in use in the 9370's diagnostics. IBM is under pressure to improve its expert systems. "Expert systems people are not enthusiastic about IBM's tools."

On the future of the Cross

System Product (CSP) — what future?

TASKER: "Enhancements to CSP are overdue" and should be coming in the next six months.

SEYBOLD: "SAA is the platform of the future. DEC doesn't have anything like it." Silverlake will be the first machine built for the SAA architecture.

WITHINGTON: "SAA is effec-

tively a replacement. IBM will go with it." There may be some enhancements to CSP, just to satisfy existing customers, but "it is not the main thrust."

DAVENPORT: "I don't hear much about CSP. SAA is the current buzzword." IBM may drop CSP in favor of SAA, "but some group at IBM is hard at work on CSP." Enhancements may show up in the near future.

KUTNICK: "CSP must become more like SAA." CSP needs a better interface and more features. There will be continual re-

"SAA is giving IBM's friends a range of arguments against DEC."

PER FLAATTEN
ARTHUR ANDERSEN & CO.

leases with advances in both CSP and SAA.

FLAATTEN: "It's tough to call. I have a low opinion of CSP" because it is hard to work with. Some enhancements are likely between now and the end of 1988.

SAA is the critical development in the long term. "SAA is giving IBM's friends in the corporations a range of arguments against DEC."

With the steady development of SAA, IBM proponents within its large corporate accounts can deflect criticisms from DEC proponents.

ATRE: "The problem with CSP is that it is not really integrated with other products." CSP is an older product from the 8100 world, but it will stick around for at least another year.

"It is not a strategic product for IBM."

Ultimately, CSP may give way to SAA, but that is years away. "SAA is still a concept in somebody's mind. The only thing on paper is 20 pages, which they gave out in May."

On the Series/1 — is the end here?

SEYBOLD: "Not much is happening." It is really a communications processor.

DAVENPORT: "It's primarily a data communications controller." If it has a future, it is for communications rather than computing. There is one scenario in which the life of the Series/1 may be prolonged:

"As desktop devices continue to proliferate, there is an increasing need for the function [of controller]."

In order to fulfill that function, the Series/1 would have to be upgraded, particularly in terms of the number of ports housed on it.

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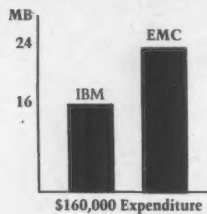
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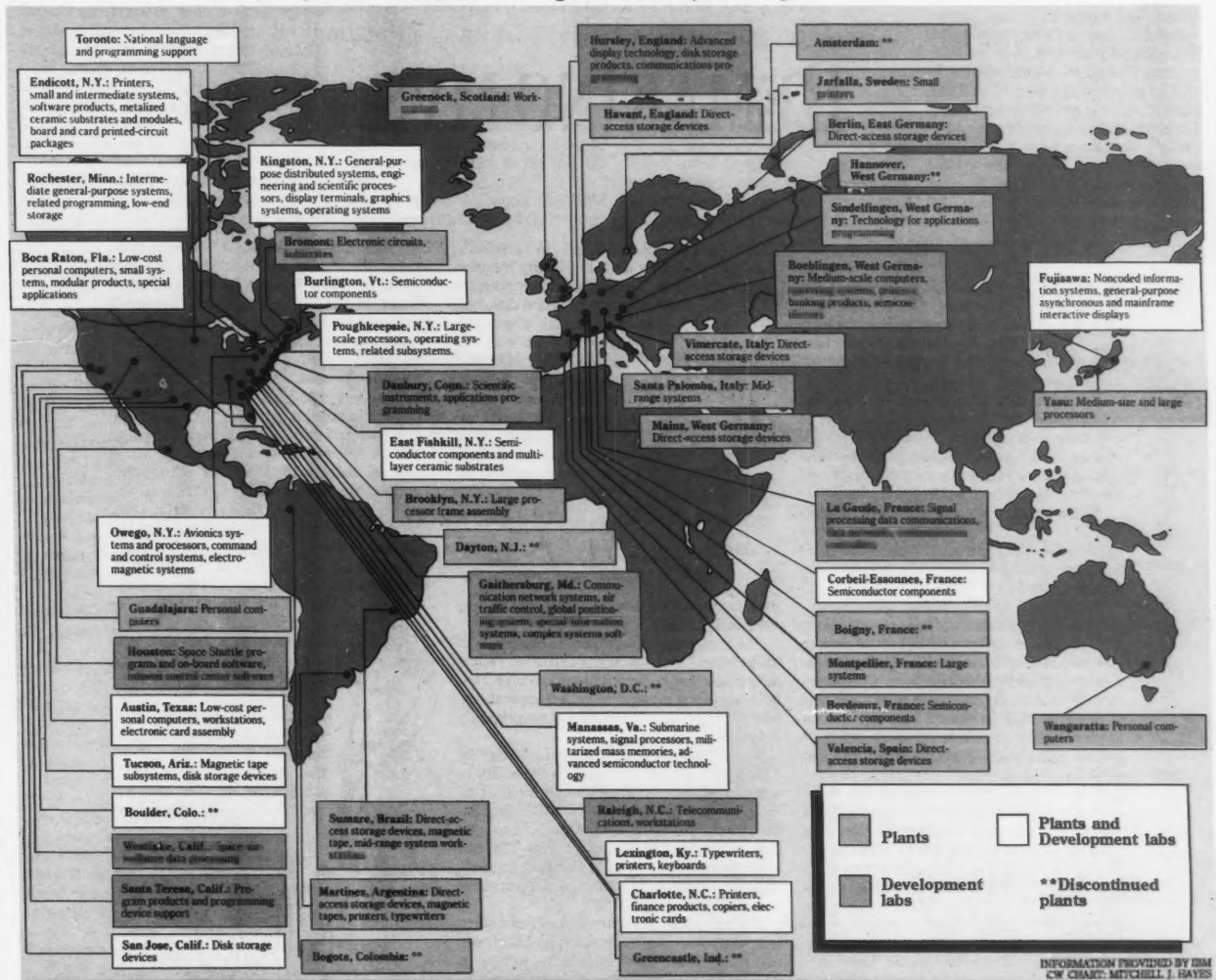
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Circle Reader Service Number 59

IBM's worldwide manufacturing empire

IBM's 35 manufacturing plants are located in many parts of the world to serve regional markets — development facilities are associated with most of the plants to link product design with manufacturing



INFORMATION PROVIDED BY IBM
 CW CHART: MITCHELL J. HAYES

THE \$20B INVESTMENT

No part of IBM is exhibiting more fundamental signs of change in 1987 than manufacturing. Massive redeployment, the closing and reassigning of plants and a new emphasis on production efficiency are all part of the restructuring of the company's multibillion-dollar manufacturing infrastructure.

During the last five years, IBM has invested \$20 billion in plants, equipment and property. IBM's revenue is not keeping pace with such expenditures, and many of the plants are operating below capacity.

Faced with this situation, IBM's only choice is to cut expenses. "We would like to reduce overhead by 20% to 30%," says Heinz Fridrich, IBM's director of manufacturing.

To meet this goal, IBM has transferred more than 15,000 manufacturing employees to marketing or service divisions. It is reducing the proportion of managers from 12% of the manufacturing work force to 8%.

IBM has closed a plant in Greencastle, Ind., marking the first time that a facility was discontinued rather than reas-

signed. Plants in Boulder, Colo.; Hannover, West Germany; and Amsterdam have been reassigned to nonmanufacturing roles.

IBM has also added three Rolm Corp. plants to its manufacturing facilities as it continues to absorb the telecommunications company. The additions include plants in Santa Clara, Calif.; Colorado Springs; and Austin, Texas.

Besides transferring workers and reducing the number of IBM plants (from 39 to 35), the manufacturing divisions are consoli-

dating by moving production lines out of some plants and into others that are working below their capacity. For example, production of IBM's Proprinter line was moved from Charlotte, N.C., to one of the company's most automated plants in Lexington, Ky.

The focus on efficiency is also seeking to cut overhead by reducing the number of workers required on each production line.

One result of the reductions is the loss of experienced manufacturing workers to other divisions. "When we move a young engineer with up to three years with the company to marketing, it creates a hole in manufacturing. I have to fill that somehow,"

Fridrich says.

In the midst of these changes, Fridrich is trying to establish order. "What we did over the last 12 to 18 months is put some real structure in place and develop measurable goals. I tried to consolidate all of the things that we're doing so that everyone can look at it and agree upon how well it is being accomplished," he says.

Fridrich hopes the major changes from the consolidation are behind him. "If I have to lose four plants every year, pretty soon I'll be out of plants. It was an important direction, but now we're pretty much through the consolidation phase."

MICHAEL SULLIVAN-TRAINOR

HOW — TO

REMAKING MVS

BY STEVE PIGGOTT

When the folk singer Melanie asked the question, "What have they done to my song, Ma?" in the early 1970s, she could well have been echoing the sentiments of present-day IBM program developers.

But while the distinctive-voiced chanteuse couldn't see why her fellow artists needed to add their own embellishments to her simple melody, IBM is slowly beginning to appreciate why its customers insist on providing their own variations to well-trying and tested products.

IBM's principal operating system, Multiple Virtual Storage (MVS), together with its two major subsystems, Job Entry Subsystem (JES) and Time Sharing Option (TSO), are especially open to tinkering.

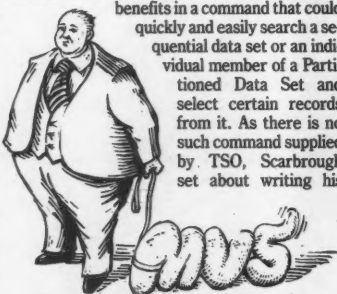
But is it so surprising that an operating system consisting of millions of lines of code fails to meet all the demands of its user base of close to 20,000 customers? It is surely unrealistic to expect any complex piece of software in its purest form to meet the diverse needs of its users, and to this end, IBM provides a host of user exit points within its software so users can build greater functionality, usability or security into their systems.

These provisions are fine as far as they go, but MVS users still find the need to tinker with the actual code supplied by IBM and to add routines of their own in order to finish up with a system that meets all of their requirements. IBM strongly discourages users from making direct alterations to its code, but many ignore this advice.

TSO is particularly susceptible to being adapted and extended. Vance Scarbrough, a senior systems programmer

at Daniel International Corp. in Greenville, S.C., found a major omission among the commands offered by TSO. He saw many potential benefits in a command that could

quickly and easily search a sequential data set or an individual member of a Partitioned Data Set and select certain records from it. As there is no such command supplied by TSO, Scarbrough set about writing his



own, incorporating a very comprehensive record filtering facility.

His final version confirmed his opinion as to its usefulness, and, following the routine's popular introduction, it was put to work, where it has been used in a number of varied applications. Many of these applications he had not originally envisioned.

The Command List (CLIST) facility of TSO provides programmers with the ability to write their own executable code under TSO using a language of its own. Most MVS installations have built up dozens of CLISTs to plug some of the functionality gaps of both TSO and MVS and, generally, to make the programmer's life easier. Swapping CLISTs is popular at many users group meetings.

Peter Hayden has written a CLIST that sorts data sets under TSO. He has seen his efforts well received at Tesco Stores Ltd., located in Welwyn Garden City, England, where he is currently a consultant programmer. By exploiting the facilities of dialogue management, his routine can be executed directly from TSO or from the Interactive System Productivity Facility, commonly known as ISPF, which runs under TSO. Again, Hayden found it necessary to augment a widely used and popular piece of IBM software with code of his own in order to provide a rather basic facility.

JES is another area in which changes are frequently made. As with much IBM software, the user base is so broad and varied that JES is not geared to any one sector. For example, many users feel that the output produced by some of its master console display commands could be improved to help the operators. These users have found that ironing out some minor irritations and removing inconsistencies can considerably improve operator productivity.

Keith Sherwell, senior systems engineer at Grand Metropolitan Information Services in

Uxbridge, England, saw the advantages in extending the display produced by the JES \$DF command, which lists the jobs waiting to be printed on the JES output queue. Sherwell's modification adds a forms parameter to the command so that the output can be restricted to the jobs of just one type of printed output.

His modification was written in two parts. The first part changes the JES module HASPCOMM to define an extra key word and to insert a user exit point, which is used in the second part. The second part contains the actual assembler code for the JES2 user exit routine. The operators at his installation can now display the JES printer output queues by forms type. This ability allows the operator to schedule the work load on the printer much more efficiently.

Another UK site boosted the \$DI command, the JES command used to display initiators.

When \$DI is invoked at the operator console, it shows the job numbers of all active jobs, plus the job classes assigned to each initiator.

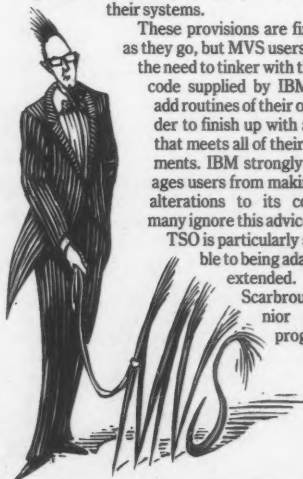
Unfortunately, the display does not show the names of the jobs that are running. If operators want this information, they must enter a series of \$DJ commands, one for each job number in which they are in-



terested. As it was a frequent requirement for operators to know both the job number and the job name of the jobs executing, the site made a modification to the \$DI command that added job name information to the display.

The modification was in the form of a "zap," (a systems programming utility that makes changes directly and permanently to MVS load modules) to the JES module HASPCOMM. The modification exploits the fact that there is a provision in HASPCOMM for support of 36 job classes for each JES initiator. Since no installation is likely to need anywhere near this many, an amount of otherwise unused storage was freed up and used as a patch area for the modification.

Under MVS, magnetic tape files are protected against accidental overwriting by having the date they are protected by the operating system until written onto the tape when it is created. If a date-protected tape file is accidentally



ILLUSTRATIONS BY BOB DAHM

Piggott is editor of "MVS Update," a monthly newsletter published by Xephon Technology Transfer Ltd. in England. Xephon's U.S. contact is at P.O. Box 4480, Winter Park, Fla. 32793. Piggott has 16 years of experience working in an IBM environment and was a systems programmer in an MVS installation before joining Xephon.

mounted with a view to be written to, MVS issues an error message that gives the operator the opportunity of canceling the job or proceeding, thus bypassing this date protection.

A Brazilian contributor to the newsletter "MVS Update," published by Xephon Technology Transfer Ltd. in England, perceives this bypass as a potential danger to security and has implemented much stricter controls at his installation. He added code to IFG0193D, IFG0196Q and IFG055B — three IBM tape label processing routines — to pass control to a routine that he has written.

This Supervisor Call routine checks if the tape file's data set name has been cataloged. If it has, the tape is unloaded immediately, without giving the operator the chance to overwrite it. At this site, all tape files must be uncataloged before the tape volume can be written to.

If an Integrated Catalog Facility catalog gets corrupted during the course of running a day's work, it is necessary to restore the latest backup copy of the catalog and to reapply the updates that have been made to the catalog since the latest backup was taken. This action may sound simple, but there is no IBM-supplied utility that will reapply these changes to the Integrated Catalog Facility catalog.

In practice, users must make their own arrangements and are responsible for writing their own solutions to the problem of forward recovery. This task is by no means trivial. Some installations weigh the advantages of having their own routine against the time, effort and expense needed to develop it, and they decide to live dangerously and do without it.

Recovery of 'sick' catalog

Someone who has not been tempted onto this potentially dangerous path is Ian Fairbrother, a systems programmer with Eagle Star Insurance Ltd. in Cheltenham, England.

Having discovered that catalog management routines log to the SMF data set any additions, deletions or updates made to a Basic Catalog Structure, Fairbrother has written an assembler program that extracts this SMF data and produces a detailed report showing all the relevant information required for the successful recovery of a "sick" Integrated Catalog Facility catalog.

There is a good chance that Fairbrother's program will never be used "in anger," but at least he can relax, safe in the knowledge that it is there just in case it is ever needed.

Users who like to reset the performance groups of their jobs, especially those who like to run their batch jobs with a performance group reserved for CICS, IMS, JES, VTAM and so on, are definitely a problem. Not only can they cause more performance problems than they solve, but they can also seriously devalue any performance measurements based on performance groups.

It was just such an abuse of the MVS RESET command that confronted Bruce Bordonaro, system software manager at Electronic Data Systems Corp. in Mahwah, N.J. His solution was to enforce the same restrictions on users that were currently provided by the IEAICS member in SYS1.PARMLIB. The IEAICS member contains the initial performance group definitions for different batch users, started tasks and TSO users.

Bordonaro has added code to the RESET module IEEMB810, to branch to a

IT IS unrealistic to expect the MVS master console to be manned permanently, with someone keeping an eye out for vital messages. There are, however, certain messages that should cause the alarm bells to sound immediately if they are ever encountered.

routine that he has written himself. This routine then accepts or rejects the resetting of the job's performance group on the basis of the user's entry in the IEAICS member.

It is unrealistic to expect the MVS master console to be manned permanent-

ly, with someone keeping an eye out for vital messages. There are, however, certain messages that should cause the alarm bells to sound immediately if they are ever encountered. For instance, if a warning of no more available space in a user catalog is left unheeded, the consequences can be

quite disastrous.

Fortunately, there is a user exit provided, IEAVMXIT, which traps communications destined for the master console and allows users at this point to interrupt the normal flow of events by inserting their own code. In this way, they can intercept certain messages and execute their own actions when and if they occur.

Silvio Sasso, a systems engineer with Winterthur Insurances Co. in Winterthur, Switzerland, saw a potential mechanism for automating the way in which his installation dealt with error messages that indicated a user catalog was full. Unfortunately, the error message he was checking for (IEF287I data set name, not CATALOGED 4), is not issued in a man-

Continued on next page

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MVS

FROM PREVIOUS PAGE

ner that enables it to be trapped for using IEAVMXIT.

Undaunted, Sasso then turned his attention to the routine that issues message IEF287L.

By changing this routine to issue an SVC 35, he was now able

to intercept the message and invoke his own procedures to ensure that, in the event of a catalog becoming full, no subsequent damage is done and timely action is taken.

Sharing between jobs

Data set contention occurs all too frequently at many sites, caused by two or more jobs wanting to access the same data

set with one of the jobs unwilling to share it. MVS puts the job or jobs detecting the contention into a wait state and issues a warning message to the console operator.

This action can happen in quite normal circumstances and be quite a legitimate occurrence — or it can be the result of someone mistakenly coding DISP=OLD instead of DISP=SHR

on a Data Definition Job Control Language statement.

The warning message issued to the console operator fails to reveal who has reserved the data set. The data set could be being reserved by any one of many batch jobs, TSO sessions or started tasks currently executing on the machine.

To make life easier for the operators at Inter-City Gas Corp.

in Winnipeg, Canada, Rick Aglik, a technical support programmer, has written and implemented a program under TSO to provide this information.

Anyone at his installation with the requisite authority can now tell at a glance who is preventing his job from proceeding and take the appropriate action.

A problem that confronts many performance analysts trying to evaluate the usage of resources made by IMS programs relates to the way in which IMS is positioned as an extra layer of software between the application and the operating system.

As a result of this, the name of the IMS initiation program,

DATA SET contention occurs all too frequently at many sites, caused by two or more jobs wanting to access the same data set with one of the jobs unwilling to share it.

DFSRRCOO, rather than the name of the IMS program that is actually executed, is recorded in some System Measurement Facility (SMF) records.

To get around this problem, Edvin Vik, a senior systems engineer with Amdahl Norge A/S in Oslo, Norway, has made use of the SMF step initiation user exit, IEFUSI.

By taking the program name from the Scheduler Work Area and putting it into a user-defined field in the SMF activity record, he is now able to extract important IMS information that he was previously denied.

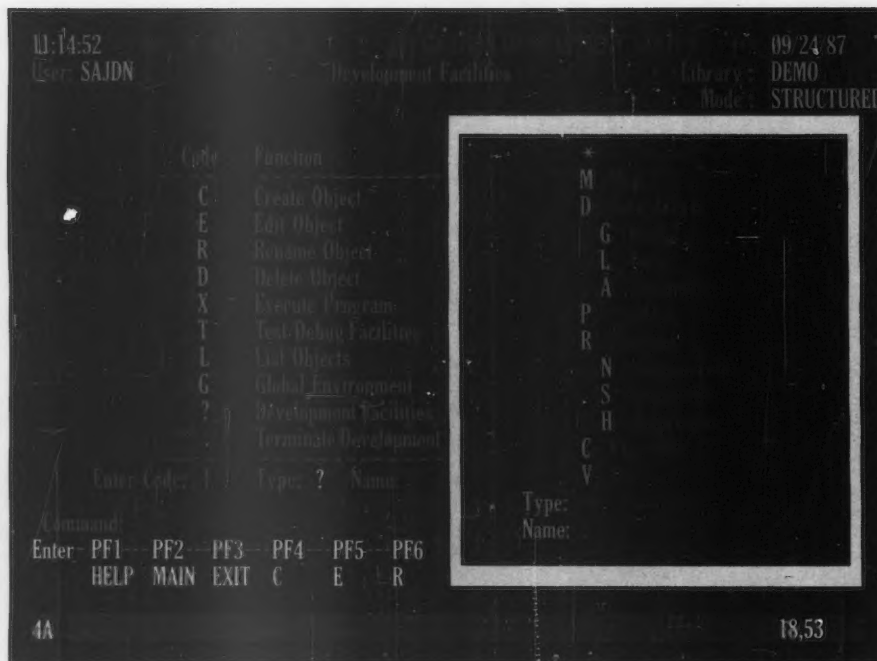
IBM frowns on changes

IBM takes every opportunity that it gets to emphasize to its customers how the implementation of user modifications will slow their migration to later software releases.

While user exits will work in nearly every case across different releases, there is no such guarantee in instances when the user has changed IBM-written code or has used his own method of interfacing with IBM software.

The fact that so many users choose to customize their systems to the extent that they are faced with huge amounts of work in reapplying these changes each time the software is upgraded underlines their determination to run systems that meet their business needs in full.

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◀ INTERVIEW ▶

David McDowell

SERVICE BEFORE IT BREAKS



JOHN CHASSON

David McDowell, president of IBM's National Service Division, is responsible for providing hardware and software service support for all IBM-standard product lines. He started as a customer engineer in 1962 and attained his current position in July.

Computerworld senior writer Michael Sullivan-Trainor interviewed McDowell concerning changes in the service division this year.

In what ways is your organization carrying out the "Year of the Customer" theme?

We have conducted customer interviews, focus groups and research studies to determine what the customers want and need. We are trying to get our offerings in line with those wants and needs.

Our goal is to create a better balance between our value and our pricing.

What specific needs are you identifying?

The customers are saying they need help in supporting their operating environment, not just fixing it after it breaks. They want us to do more to assist them with their environment. That might mean more help with installation, problem determination or facilities design and setup.

How are you responding to those requests?

We are making sure our field force is sitting down with the customer, understanding the customer and responding to his needs individually—uniquely, in many cases.

Is there a single survey that assesses customer needs?

No. That suggests there is a single set of needs. We are trying to be flexible enough to respond to each customer with an individual set of responses rather than trying to say there is one solution for a lot of people.

What is the origin of the Corporate Service Amendment (CSA), and where does this offering fit in with your overall goals?

Some of our customers are very good at the systems management procedures and operational disciplines that tend to prevent problems or at least reduce their impact. In fact, they were eliminating a lot of problems and, in effect,

screening out anything that wasn't an absolute maintenance call.

They did these things by installing help desks and implementing all of the account management disciplines and procedures, and that reduces our cost.

So the origin of CSA, or the mid-range part of CSA, is to pass our savings back to the customer if they are willing to do those things.

We have fewer service calls with these customers, and when we do have a call, we know a lot more about it. There is a lot of information gathered, focused and available when we arrive, so it reduces the time it takes and the absolute number of calls when they do all of these things.

How many people have signed up for CSA and failed to meet the requirements?

Not very many people fail when they apply. But by the very nature of applying, they've indicated an agreement to do it. In fact, we will help them do it if they have not done it.

There have been very few that have failed the initial assessment, and none have failed the reassessment.

The mid-range amendment has fewer qualification criteria. Does the same concept apply here? That is, are you making fewer calls and passing the savings on?

It is the exact same concept in a less difficult environment.

Those customers will install help desks, and they will do the appropriate systems management procedures and account management disciplines. They will perform change control and problem tracking.

They will do all of those things regardless of whether it's mid-range CSA or CSA, and those

are the things that reduce our costs. It is perhaps to a smaller degree in the mid-range, but it is still a cost savings.

Are CSA and the mid-range agreement a response to increased competition? For example, third parties have been more discount-oriented in the past, and now IBM is getting into the discount game.

CSA is really a response to our customers, to their ability to demonstrate a savings to us. We tried the programs in test accounts for some months, and the customers demonstrated how it reduced service costs. That is the basis for our discounting.

Are discounts on maintenance also given as a part of negotiations for equipment purchases?

No, I have never heard of it.

Our basic principle is to give discounts based on our cost savings. If we have cost savings because of something the customer is doing or because of the particular environment the customer has established, to the extent possible we will pass those discounts back to the customers.

All discounts should be treated the same in this way.

Is IBM making it more difficult for third-party competitors to obtain parts?

IBM does nothing for the purpose of making it more difficult for somebody.

We will take actions that improve the level of service that we provide or make our service delivery more efficient and cost-effective, and in some cases we will take action to minimize any adverse impact on our people from a work load standpoint.

Those are the only things we will take action on. We will not take action to do anything to make it more difficult for anybody.

We have been selling parts to customers from branch offices. We will be discontinuing that and selling them from our distribution centers instead.

The reason for that is the lack of activity and expense of keeping the window open. The average branch office was selling less than one part a day, yet we had the expense of keeping the skills and paperwork going. It was very expensive to do.

Secondly, we stock a limited number of parts

Continued on next page

SERVICE

FROM PREVIOUS PAGE

in the branch offices, and the way we determine what to stock there is according to the inventory that is under contract for that branch office.

We anticipate, based on that specific set of inventory, what the failure rates are and stock accordingly.

Any unexpected sales will mean that a part may not be there when it is needed.

So you have to compensate for that by overstocking.

Because of a combination of overstocking and a lack of activity, it didn't make business sense to keep that window open.

"WE ARE TRYING not to just fix a machine after it breaks, which is where remote service is most efficient and effective. We want to do more up-front and predictive maintenance. We want to get in and understand a customer's environment."

DAVID MCDOWELL
PRESIDENT, IBM'S NATIONAL SERVICE DIVISION

Are more of your service personnel being deployed out in the field?

We are doing some limited hiring. We have also added about 400 transfers

from manufacturing and development locations in the last year to year and a half.

People are placed in different areas depending on their skills and their inter-

ests. We give them a choice based on what they want to do and their geographic preference and whatever is available.

Most of the people transferred become customer engineers.

What's the main purpose of beefing up personnel in the National Service Division?

We want more of a presence in the customer sites. It is a growing business.

We are trying not to just fix a machine after it breaks, which is where remote service is most efficient and effective.

We want to do more up-front and predictive maintenance. We want to get in there and understand a customer's operating environment.

We want to see what we can do to minimize the impact of a failure if it does occur and understand what we can do to keep a failure from happening.

We want to get involved in planning with the customer to make sure what we are doing is conducive to meeting their goals.

That is not remote activity. That is presence.

Do these calls involve an individual from service as well as an individual from marketing?

Marketing is in the business of selling solutions to customer problems, and service is part of that solution. Service and marketing tend to work together in solving the problems of a customer's environment.

We've had joint calls for a long time and will continue to do that. We're presenting an IBM face to the customer.

Is there more emphasis being placed right now on obtaining service revenue from the mid-range than from the mainframes because of the slowdown in mainframe sales?

I wouldn't break down maintenance revenue by product. That is not where we are going.

We are looking at maintenance revenue based on the customer's operating environment.

We have machines that fail once every 15 years. It becomes less important how much revenue you are getting off that machine.

We are looking at what kind of value we are providing to that operating environment and what kind of revenue comes from it.

A lot of the things that I've talked about — getting involved with helping the customer more, preventing problems, doing systems-level analysis — these aren't product-specific anyway.

It really becomes less and less useful to look at revenue by product.

What reaction are you getting from customers? It seems that you are asking them to invite you to join them in their planning process.

No. The customer is asking us to do these things. He doesn't want to have a failure.

The customer wants us to do more to prevent failures, analyze what is going on with their system and participate to completion on a problem where perhaps neither they nor we know where that problem is.

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Circle Reader Service Number 62

THE BOTTOM LINE

COST CONTROLS DRIVE PROFIT

BY MICHAEL GERAN

IBM is expected to report revenue of slightly more than \$54 billion this year, but its net earnings are expected to be only \$5.2 billion. Although the firm's revenue rose 19% during the last three years, net earnings declined an estimated 20%.

It will be mid-1988 before the company can report strong year-over-year revenue gains. As a result, IBM's profit recovery will be cost-driven in the short term — in other words, a slower rate of increase in costs than in revenue.

IBM is a marathon runner, not a sprinter. The firm's size, complexity, product overlap and management style have resulted in extended product cycles and

an evolutionary, not revolutionary, transition.

The company needs multiple major new product cycles to grow as fast as the industry. Today, unlike in the past, IBM requires all three principal product lines — mainframes, personal computers and mid-range systems — to be synchronized. By 1990, annual revenues from PCs, workstations and mid-range computer systems will be about equal to mainframe revenue.

At this point in IBM's product cycle, costs are fixed and revenue gains are modest, resulting in margin pressure. However, two changes began in the third quarter.

First, an early retirement program of about 13,000 employees reduced the increased rate of selling as well as general and administrative, research and development and engineering expenses.

Second, better-than-expected foreign currency translations and an increase in Personal System/2 and 3090E shipments improved year-over-year revenue-gain comparisons.

By contrast to this year, the earnings outlook for 1988 is brighter, enhanced by the following developments:

- New products will be in volume production.
- Full-year effects of this year's employment reduction will be noticeable, especially in the manufacturing area.
- Strengthening cost controls should mean that a moderate revenue increase will translate into better margins.

Processors are IBM's largest source of revenue and one of the most cyclical. After strong gains in 1986, the projected increase for this year is only a modest 1% to 2%. The outlook for 1988 is brighter, with an expected 10% to 11% increase.

Since the 1987-1988 forecast for processors is, to say the least, contentious, an additional comment is warranted. A modest gain for IBM this year, despite a lower dollar, reflects the continued weakness in mid-range products as well as the need for aggressive price reductions.

In effect, the moderate gain in large mainframe sales from the 3090 family will not be enough

to compensate for mid-range product weakness.

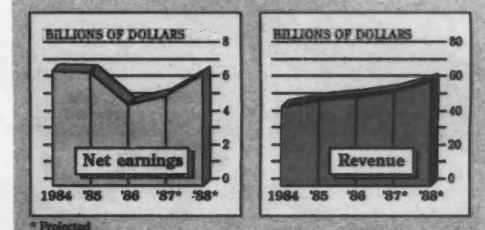
However, beginning in 1988, the trend should change, because IBM will be able to ship in volume two new systems with the needed software. The firm should ship 5,000 to 6,000 9300 systems this year and 18,000 to 22,000 in 1988.

The majority of this year's shipments will be in the last four

Continued on next page

IBM'S PROFIT SLUMP

IBM's profit growth should resume as new product strategies take hold



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Geran is first vice-president, equity research, for E. F. Hutton & Co. in New York.

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AROUND IBM

What follows is a collection of notes on research, marketing and administration at IBM in 1987 that was compiled by senior writer Michael Sullivan-Trainor.

In the labs. In October, scientists at IBM's Zurich research laboratory won the Nobel Prize in physics for discovering high-temperature superconductivity (the ability of certain materials to conduct electricity without resistance) in a new class of materials.

J. Georg Bednorz and K. Alex Mueller found that a particular class of oxides becomes superconducting at temperatures significantly higher than the previous upper limit, established 13 years earlier.

The old limit of 23.3 degrees above absolute zero, or 23 degrees Kelvin, was reached in 1973 using a compound of niobium and germanium. In 1986, Bednorz and Mueller found superconducting oxides at 35 K. Earlier this year, groups of researchers at other laboratories around the world found an oxide composition that becomes superconducting above 90 K, opening up further study of the material's potential.

Last year's Nobel Prize in physics went to IBM scientists Gerd Binnig and Heinrich Rohrer for inventing the scanning tunneling microscope, which allowed surfaces of materials to be seen at the atomic level for the first time.

In a more immediately applicable breakthrough, engineers at IBM's Essex Junction, Vt., facility have developed a computer chip that can store four times more data than the memory chips now used in the company's most advanced computers. The experimental chip can store more than 4M bits of information, yet it is only one-third larger than the 1M-bit chips that are currently in volume production. It operates about 18% faster.

IBM is building a new semiconductor facility in East Fishkill, N.Y., that will incorporate innovative technology from the concept stage through production. Called the Advanced Semiconductor Technology Center, the plant will feature electron-beam characterization tools and a compact electron-storage-ring lithographic tool. The ring uses X-rays to produce lines less than 1 micron wide. Construction of the 225,000-sq-ft center began in December 1986 and is scheduled to be completed in 1989.

Pushing products. This year, IBM began shipping more than 700 new hardware and soft-



IBM employee Don Lunsford holds an oversize model of the 'golf ball' print element from IBM's Selectric typewriters.

ware products, including the 3090 Model 600E, its most advanced computer.

Cornell University's National Supercomputer Center purchased one of the first \$20 million Model 600Es, obtaining 60% more processing power than it had with its installed 3090 Model 400.

IBM boosted its storage systems with the 3380 disk control unit, upgrading capacity to 2.5 billion characters per stack of disks, access speed to 16 msec and read-write speed to 3 million char./sec.

In the mid-range, IBM provided delivery of two models of the 9370 in July, nearly two months ahead of schedule. Other 9370 models were available in October.

IBM had shipped its millionth Personal System/2 by the end of October. But how many units included the Micro Channel? Analysts estimate that no more than 40% of the high-end PS/2s were shipped.

After holding up for 26 years and logging more than 13 million unit sales, IBM's Selectric typewriter, the last that used the "golf ball" print element, was sold. The Wheelwriter and Quietwriter series, both electronic typewriters, replaced it.

As part of its new vertical market strategy, IBM fortified its banking line with new product announcements early this month. The 4700 Finance Communication System, including the 4702 processor and 4701 controller, will be enhanced with new displays, printers, connectivity options and operating system extensions. A new financial workstation family based on the PS/2 will also be offered.

In addition to these enhancements, IBM replaced its automated teller machine with a new generation and added a 1,000 document/min check reader and sorter.

Changes at the top. In March, IBM's board of directors named former sales- man Kaspar Cassani and former engineer Jack Kuehler as executive vice-presidents.

Cassani assumed the responsibilities of former Vice-Chairman Paul Rizzo, who retired in August. Cassani is now responsible for IBM World Trade Europe, Middle East, Africa; the World Trade Americas Group; the World Trade Asia/Pacific Group; and IBM's Information Systems Group.

Kuehler is responsible for IBM's Federal Systems Division. In addition, he remains in charge of the Information Systems and Storage Group and the Information Systems Technology Group. Senior Vice-President C. Michael Armstrong, a former systems engineer, succeeds Cassani as president director general of IBM Europe.

While consolidating its marketing organization into five divisions and restructuring manufacturing, IBM created two new units to represent new interests in software and mid-range systems.

Vice-President Joseph Guglielmi was named president of the new Application Systems Division, and Vice-President Larry Ford was named assistant group executive for mid-range systems. Both report to Edward Lucente, vice-president and Information Systems Group executive.

Overseas deals. Denmark's largest local telephone company, Copenhagen Telephone Co., joined with IBM last summer to form Dannet, a \$15 million value-added network services company. The company will begin operations in January 1989.

IBM's Software Development Support Center in Sydney, Australia, is acquiring international marketing rights to existing Australian software products and is funding new developments. These moves are seen as part of an effort to help Australia's growing software industry break into world markets. The action comes at the same time as efforts by the Australian government to encourage high-tech exports.

Still No. 1. Executives of 615 corporations interviewed in a survey sponsored by the American Society for Quality Control named IBM the No. 1 company, in terms of overall quality, by more than a 2-to-1 margin. The award was presented at the group's annual National Quality Forum in New York.

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